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ART. LXVIII.—LECTURE, INTRODUCTORY TO THE COURSE ON PRACTICAL PHARMACY, DELIVERED AT THE HALL OF THE PHILADELPHIA COLLEGE OF PHARMACY, OCTOBER 25th, 1847.* By William Procter, Jr.

Gentlemen:—We have assembled this evening to commence the course of Lectures on Practical Pharmacy, and I take advantage of the occasion to proffer you a friendly greeting.

You have already listened to the introductory addresses of my colleagues, the Professors of *Materia Medica* and of *Chemistry*, who have exposed the importance of two great branches of pharmaceutical education, and in complying with this time-sanctioned custom, I know not in what way to better employ the opportunity afforded, than by asking your attention to some general, though, perhaps, not unimportant remarks, on the profession of Pharmacy.

The business you have adopted is an honorable one; it is a pursuit in which any mind may engage without contravening the best principles of his nature, because it is necessary and useful. Its skilful conduction calls for an extensive range of knowledge, and few vocations tend more to excite scientific investigation and mental activity. A great

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variety of objects are brought before the mind, the history of which connects them with almost every country and people, whilst their qualities are often so striking and curious, as to invite examination. It was such circumstances and objects, aided by the mysterious workings of the chemical laws, that prepared the foundation of that love and search for scientific truth in the apothecary's boys of Penzeance and Gottenberg, which resulted in a Davy and a Scheele.

The natural history of the Materia Medica is intimately interwoven with that of the kingdoms of nature and the Naturalist has largely contributed to extend its borders. The arid deserts, the luxuriant deltas, and sombre forests of the tropics, the moss covered and icy rocks of the extreme North, the highest mountains and the deepest oceans, all yield their tribute to the healing art; and the pharmaceutist finds collected around him, through the agency of commerce, these diversified productions of every clime.

To understand their characters and derivation he has to familiarize himself with Botany, Zoology and Mineralogy, which alone are able to determine them with correctness; whilst in the laws of chemistry and physics, he obtains an exhaustless power to combine and fashion them into the numerous compounds and conditions which constitute and characterize the catalogue of medicines.

The pursuit of those sciences, for themselves, presents a broad field for the intellectual powers, and the apothecary, occupying a point toward which they converge in lending their aid in the cause of humanity, enjoys a position which enables him, when disposed, to choose from them whichever most accords with his tastes; and often without neglecting his daily duties, he may not only contribute to his own gratification, but by the accuracy of his observations may materially advance the cause of scientific truth. In his occupation, he is constantly interrogating nature, and eliciting facts favorable to its object; and where the performance of these labours is accompanied with research and reflection,

the most trivial incidents may originate discoveries far outreaching in their influence the boundaries of his special department.

It is a fact, however, that the majority of those who practise Pharmacy, do it solely for a livelihood; they have no views beyond the profits, and, as a natural consequence, every thing is made subservient to that object. They view the business as a lucrative one, bring the habits of the merchant to bear in the promotion of their interests, and science (whose true position is in the foreground) is tolerated only in so far as she lends her aid and advice in the process of accumulation.

Some individuals enter the lists of Pharmacy under delusive impressions, or are placed there by guardians who are equally misguided, illy prepared by education or endowments for so responsible a vocation. It is a sad spectacle to behold such giving their earlier years and youthful energies to a profession not suited to their talents or inclinations, pursuing it, perhaps, until, on the threshold of manhood, they find themselves about to be cast on the ocean of society in a vessel with whose qualities and powers they are too slightly familiar to enable them to cope with the difficulties that assail them. Many who are unsuccessful as apothecaries, might have arisen to respectability and competence in other pursuits, more harmonious with their inclinations or natural gifts. It too often happens with these, that, repelled by ill success from their legitimate calling, they are induced to bow before the image of empyricism, in the hope of a golden reward, and prostitute that knowledge that they never should have acquired, to the invention of nostrums, and forcing them into notice.

But ill success is not always the result of a false position, nor is success the invariable sequence of endowments and advantages. There are individuals on whom nature and fortune have not smiled in their distribution of talent and favours, but whose indomitable perseverance and indus-

try have triumphed over their scanty allotments, and gained them a position, despite difficulties that would have damped the ardour of many a more fortunate student.

In thus speaking, it is with no view of raising clouds of discouragement and distrust; on the contrary, it is intended to draw such inferences as will prove a source of hope and satisfaction to all who enter this hall with the true motives.

The pharmaceutical beginner should be thoroughly impressed with the fact, that there is nothing really valuable in this world to be gained without industry, and that perseverance will conquer the difficulties of any pursuit possible to his powers. He should constantly keep in mind that the main object of his apprenticeship is the acquisition of a thorough and solid pharmaceutical education; in a word, to become master of his profession. With this view to the future, he will perform more cheerfully the tedious and often disagreeable details of his daily course; knowing that they are inseparable from the business; and that time will make it his province to *direct*, as it is then to *obey*. The interests of his preceptor should be as his own; and the disinterested performance of duty will yield him a richer reward in consciousness of rectitude, than all the temporary gratifications arising from too much attention to selfish ends.

The love of pleasure is innate in most of us,—too often it is the grand object of life presented to the youthful mind; rendering irksome and distasteful its humbler avocations,—wise is he who can cheerfully submit his pleasures to his duties, and, by a proper appreciation of the true ends of existence, extract enjoyment from every occurrence that presents; whilst his mental powers, unshackled by passion, and unclouded by discontent, are left free to wrestle with the genius of knowledge, and wrench from her those precious treasures, that she is ever ready to yield to the victorious.

It is an often repeated truism that "knowledge is power," but it is only so to him, who knows how to use and apply it to the exigencies of life. Without an active use of ac-

quired information the mind of a learned man is a mere library, and his learning might as well be in the form of ink and paper for all the advantages derived from it by himself or others. This applies to the profession of Pharmacy, which is a union of the theoretical and practical, and the learning of the apothecary is of little avail if it point not to the illustration and amelioration of his practical duties.

The design of this school of Pharmacy, like other educational institutions, is to *aid* the student in the acquirement of necessary information; it is the duty of its teachers to explain pharmaceutical knowledge systematically; and they hope to present such a view of the *materials, principles and processes*, of their departments, as will enable you, with the assistance of that energy which should characterize the student, and that field of practice which is found in the laboratory and behind the counter, in your intercourse with the public, to render you able pharmaceutists and useful members of society.

Pharmacy, in its most circumscribed definition, is *the art of preparing Medicines*. It embraces the knowledge and ability that enables an individual to modify those materials of nature, that accident or research have discovered to possess remedial powers, in such a manner as to conduce most effectually to their actions as medicines.

Theoretical and practical pharmacy may be divided into four departments or divisions. The first consists of the knowledge of simple drugs, or the Materia Medica, including their natural history, derived from the researches of Botanists, Zoologists and Mineralogists; their commercial history, which points out the sources from whence derived, and other facts that aid in forming a correct judgment of their genuineness; their physical structure, taste, and odour, gained by a strict scrutiny of their sensible properties; their chemical composition as exposed by the analyses of chemists; and such leading medical properties and uses as will instruct the apothecary in the precautions requisite in dispensing them.

This department is especially useful in the choice of drugs, and is the ground-work of a good stock, without which, it is hardly necessary to observe, all subsequent nicety in pharmaceutical treatment will be labour lost. The natural causes of imperfection, arising from growing plants in ungenial climates, and their unseasonable collection; together with the deteriorating influences of age, light, moisture, etc., are duly explained and remedies suggested for defending and preserving them, so necessary to the druggist. And finally, it points out the adulterations and falsifications that drugs are liable to from the cupidity of collectors and dealers, (a species of rascality that is abundantly practised at this time,) and indicates the means of their recognition and detection.

The second division comprehends the study of the chemical and physical laws bearing on pharmacy. It is here that the most difficulties occur to the student. He has to master the general principles of Chemistry, and such of the physical laws as are embraced in the subjects of heat, light, electricity, and the structure and divisibility of matter. The principles of mechanics, hydraulics and hydrostatics, are exceedingly useful in the construction of apparatus or its adaptation to processes, and should be studied with a view to these objects. General Chemistry includes the history of mineral or inorganic drugs, their mineralogical derivation, properties, etc.

The third department consists in the application of the aforesaid laws to the modification of drugs—in a word, it is *practical pharmacy*, and constitutes the mass of the every-day business of the shop and laboratory.

The ground work of practical pharmacy is expert manipulation; hence the first object in this department is an acquaintance with the elementary operations required by the apothecary. These comprehend the processes and instruments used in effecting the mechanical division of drugs; the separation of solids from fluids; the solution of solids in liquids; the extraction of the soluble from the insoluble ingredients of a compound; the evaporation of fluids and the recovery of solids

from their solutions by evaporation; the distillation of liquids and the precipitation, fusion, sublimation, etc., etc., of substances. Weights and measures, specific gravity, and a nice appreciation of quantities in general, are important features, and are constantly recurred to.

The relations that vegetable drugs bear to different menstrua, and the nature of the matter they cede to these liquids, together with the influences that light, heat, and air exercise on the solutions, by age or evaporation, constitutes one of the chief branches of the subject, including the preparation and characteristics of *infusions, decoctions, tinctures, wines, syrups, extracts, etc.;* in fact the greater part of those vegetable and animal preparations which have a complex, inexact composition, from the nature of their ingredients.

To prepare these medicines with judgment, an acquaintance with the proximate constituents of drugs is essential, those that are active ascertained, and the modes of treatment most adapted to their removal applied. For instance, *Krameria* contains a peculiar tannin, apothegm, starch, and coloring matter amongst its ingredients; the tannin being active and the rest inert,—and it is desirable to prepare an extract which shall possess the greatest possible activity. Now it has been ascertained that apothegm and starch are insoluble in cold water, but are dissolved by it when boiling, after which the starch and a part of the tannin combine to form a compound insoluble in cold water. Alcohol dissolves the tannin and apothegm and not the starch. Hence it must be apparent at a glance that the extract prepared with cold water must be superior to any other, inasmuch as it contains neither apothegm nor starch.

Again:—In the preparation of the oil of bitter almonds or bitter almond water, experience has proved that when the ground kernels are allowed to macerate in cold water for twenty-four hours before the distillation is commenced, the product is larger, if the oil, and stronger if the water is in question; a result very natural, when the properties of the constituents are understood. These kernels contain amygdalin

and emulsin, two substances that react with each other in the presence of water with the production of the oil of bitter almonds and hydrocyanic acid. Boiling water coagulates emulsin and renders it inert, and hence if the distillation is proceeded with at once the latter principle is made incapable of acting on the amygdalin before all of it has been decomposed, and the product is proportionably affected.

From these examples the value of a knowledge of the composition of drugs must be at once apparent, and its extension affords a field of research in organic proximate analysis, that has been occupied to some extent by the graduates of this school.

It is in Pharmaceutical Chemistry, however, that the most interesting labours of the apothecary are to be found. Here he is governed by exact rules, and arrives at precise results which accord with the beautiful laws of definite proportion; and as it were to harmonize, his products assume mathematical forms of definite character.

The chemist deals in certainties—demonstration is his watch-word; and the chemistry of the apothecary must partake of this accuracy. Instead of the uncertain and variable mixtures that have been noticed as resulting from the action of solvents on vegetables, he here has to deal with those curious organic principles upon which the activity of plants depend. In the discovery and isolation of these, pharmaceutists have contributed more than any others. The discovery of morphia by Sertüerner, opened to view that interesting field of research which has since been so industriously cultivated, that nearly the whole Materia Medica has been compelled to pass through the laboratory to be examined and cross-examined by its untiring votaries, until they have yielded up the secrets of their composition for the benefit of medicine.

The Pharmaceutical Chemists of Europe are a body of which Pharmacy may well be proud; they have done more for the advancement of organic chemistry than any other profes-

sion, and by the multiplicity of their labours they are now illuminating the yet misty records of animated nature, as traced in the proximate and ultimate constitution of vegetables and animals.

Analysis! What a significant meaning has this word when applied to the labours of the chemist! What mighty results are daily occurring from this magic wand, this open-sesame of science! Many apparently inexplicable phenomena of animal life and organism have been unfolded; the hidden secrets of nature brought to light; agents of tremendous energy discovered, and impending catastrophes fraught with ruin and desolation turned aside. These are the results to which the apothecary may aspire,—the path that leads to them is open—and as their is no royal road to knowledge—he may accomplish by his industry and talents what others have done before him.

But to return: the basis of analytical knowledge consists in a nice discrimination of quantity—habits of great accuracy—a keen perception of qualities, and an unflinching conscienciousness of the record of observations. The daily engagements of the pharmaceutist are in harmony with these conditions, and it only needs energy and determination to acquire them. That such knowledge is useful, none will dispute; it gives its possessor a character superior to those around him; and the public, who often require its assistance, readily concede to the analytical chemist a high place in their regard. In one's own affairs it is a source of pleasure and profit; it enables us to detect those adulterations which are introduced into chemical substances, and thus protect ourselves and patrons from the effects of these infamous practices.

The fourth division may be called the dispensing department—it is that portion of the business of the apothecary which is transacted at the counter, in which the drugs and medicines that have undergone the processes of preparation are to be dealt out to the public, either at their own demand or by the prescription of physicians.

I need hardly observe that this is the most responsible portion of his duties. On its correct accomplishment depends the

health and lives of his fellow-citizens. Intended to be the coadjutor of the physician, an error may convert him into his worst enemy: an oversight, the sale of one thing for another, a wrong label, and many other equally insignificant causes, may be productive of serious consequences.

A good dispenser requires a variety of qualifications, including a knowledge of the three branches already spoken of. Constant presence of mind is an essential requisite; he must be conscious *all the time*, of his acts, to prevent the substitution of similarly appearing substances. A foolish reverie, whilst compounding a prescription, has caused, and may again produce the most melancholy results. In a prescription of nitrate of potassa, tartar emetic, and calomel, how readily may such a fatal substitution occur; and how many of us, in recurring to our early experience, can recollect some occasion when we were on the point of committing an error of equally grave character. His acquaintance with nomenclature and synonyms must be extensive to meet the variable phraseology of prescriptions; added to which, the contemptible characters in which many medical men couch their requests, requires a judgment and decision for their interpretation, often in cases of urgency, which greatly increases his responsibility.

Physicians in prescribing are sometimes more governed by the effects of their remedies viewed separately, than by the effect of the compound, which leads them in the pursuit of their ends, to overlook the modifications due to chemical reaction: for instance, solutions of morphia, opium, or other liquids containing salts of the alkaloids, are prescribed with magnesia, the great basic power of which causes their precipitation in an insoluble form, (in most instances,) and the solution is nearly free from them. If the patient takes the clear liquid only, or is careless in mixing the soluble and insoluble contents of the vial, the desired narcotism is not produced, or is reserved to be exerted with redoubled force by the last portion of the mixture. It is the dispenser's duty to suggest the necessary precaution.

In the hurry of professional duties, it is by no means uncommon for medical men to commit serious errors in the phraseology of prescriptions, indicating wrong quantities or wrong substances. Only a few weeks since, in New York, morphia was written where quinia was intended—it was dispensed, and death followed in its train. This is not an uncommon error, and has several times came under my own notice, as it doubtless has to some of you; and in the instance mentioned had the apothecary exercised the judgment that was proper to the occasion, the prescription would not have been dispensed.

It should be a constant rule in compounding every prescription, to recur to the questions: *is this as the Doctor designed? are the doses within propriety?* or if extraordinary, *does the case demand it?* If the directions for use are appended, a judgment can at once be arrived at; if not, a little tact will gain the necessary data by enquiries of the messenger skilfully propounded;—and it is better even to delay the dispensation of the prescription until the physician has been consulted, rather than peril the life of the patient, or the reputation of his medical servitors.

The apothecaries of the United States have much less legal, but far more moral responsibility resting on them, than those of most other civilized countries, where government enacts rules for their guidance, by compelling the observance of a uniform code of formulæ. Our physicians represent every country of Europe; their prescriptions are more or less modified by the formularies and habits of their native medical authorities, and they often without due consideration prescribe remedies but illy understood. To avoid the difficulties thus engendered, requires, truly, great discrimination and clearness of judgment. A case in point occurred recently in London. A German physician directed six ounces of bitter-almond water as a vehicle in a prescription. The apothecary to whom it was taken, not having the preparation, sent to another establishment and obtained it. He then dispensed the medi-

cine literally—without a thought, apparently, of its nature—and the patient, a lady, died soon after taking the first dose! The physician was tried for manslaughter, and acquitted on the grounds of intending a weaker preparation made with the volatile oil, which he had before obtained on prescription; whilst the apothecary, who had been instrumental in bringing about the catastrophe, was held blameless in sight of the law, because, forsooth, the bitter-almond water was not recognized by the London Pharmacopœia, and he was not held responsible beyond its requirements. Can we acquit him? Should his own conscience hold him guiltless? Was it not his duty *to know* the nature of the medicine he vended, and that each dose contained *thirty minims of officinal prussic acid?*

Besides these cases, between the physician and himself, the dispenser has to assume a responsibility in the sale of *poisons* to the public for various objects; and the looseness with which this trade is effected, is often the cause of serious results. The law has not yet reached forth its arm to control their sale, as it is now doing in France, where stringent legal enactments regulate the trade; hence our responsibility, morally speaking, is great, and he is a fortunate apothecary that in the course of a long career can find no cause of self-reproach for agency in the distressing casualities that occur from time to time by the misuse of those noxious agents.

In addition to these graver duties, the dispenser has a multitude of minor calls on his attention. Advice is asked as to the qualities of materials for dyeing, bleaching, and various other matters connected with household affairs, in which chemicals are concerned. By attention to these useful, though humble and not always relevant requests, he does much for his character with the public, who, though they cannot always appreciate the value of his chemical knowledge and learning, know well how to repay that pharmaceutist, who, in addition to his legitimate engagements in their behalf, has the kindness to listen to, and the ability to gratify, numerous little wants that arise in the course of domestic life.

There is another kind of service often requested of the apothecary, which may not be so readily conceded as that just mentioned. I allude to the habit of the people to ask medical advice—often in very obscure cases—where the disease, though not very apparent, is making strong inroad on the vitality of the patient—and where nothing short of a skilful diagnosis can point out the course of medical treatment applicable to the case. Much mischief has been done by the empyrical practice of apothecaries in these cases, and such a course cannot be too highly deprecated. Prescribing, in any form, is foreign to our profession, and should be avoided when possible—*yet there are cases, in the present organization of society, which demand a certain degree of action on our part*, and it should also be our study to be able to lend a helping and efficient hand in those emergencies which sometimes occur when the physician is not near, where continued life, or death, turns on the action of the moment, and where the sympathising friends or relatives of the sufferer urge our aid till the physician shall arrive. Indifference, at such junctures, would incur the charge of inhumanity, and deprive us of that sweet satisfaction that ever arises from obedience to the dictates of benevolence.

In no business is attention to appearances more required. All that tends to deprive medicine of its repulsiveness, and silence the whims and notions of the sick and suffering, should be resorted to, whether it have reference to the medicine itself, or the manner and neatness with which it is dispensed; in fact, it is *on the exterior minutiæ* of extemporaneous pharmacy that the public are most liable to base their conclusions in comparing one store with another; hence that apothecary exhibits good policy, who pays due regard to order and neatness, and who sees that skill and kindness mark every feature of his intercourse with his patrons.

Gentlemen, this fourth department of your business cannot be learned in this hall—it is altogether practical, and your

proficiency in it must be due to your private instructor and your own industry and good sense in employing the opportunities afforded you at home. There is much that can only be learned in a long experience, and it is for this, among other reasons, that the diploma of this college requires a probation of four years from its possessor. Notwithstanding, therefore, your merit as pharmaceutists will depend in great measure on your proficiency in the three first noticed departments, your professional standing in the community, and your pecuniary interest, will be very much promoted by not neglecting the last.

In the remarks that have been made, I have endeavored to present a fair view of the profession of Pharmacy, of its aims, its responsibilities, its usefulness. In this country, however, but small progress has been made in its cultivation, in a scientific point of view, compared with its condition on the continent of Europe. The reform amongst the apothecaries of Germany dates but two years earlier than our first movements, and now *they* are unrivalled even on their own continent. The cause of this is their superior educational advantages, but more especially it is to be attributed to the all-powerful influence of government, which, in the matter of medicine, assumes the whole control. The student is compelled to a long course of study and practice before he is eligible for examination, and after success in passing the ordeal and in possession of his diploma, he has no power to commence business until he has authority from government, or buys out, with *its* consent, an already existing establishment. The German apothecary is, therefore, an officer of the government; his duties are clearly defined; he has no competition, because the prices of his medicines are fixed by authority, and a certain district of population is assigned to his *pharmacy*, which is always sufficient to yield a handsome income. With these advantages guaranteed to them, it is not surprising that the German pharmaceutists have time and disposition for those

scientific investigations for which they have became so celebrated. In Russia the apothecary is yet more directly a government official, and is required to possess qualifications of the first order. In France, Pharmacy has also become a child of the state, but not in the sense of the German and Russian. By an act of 1840 the schools of Pharmacy were made branches of the University, and the instruction is entirely at the national expense. All students have free access to these fountains of knowledge without measure, but when application is made for the honours of graduation the ordeal is conducted with a severity and closeness far outrivalling any similar tribunals on this side of the Atlantic.

Indeed, the difficulty of obtaining a diploma, (without which it is impossible to conduct an establishment) seems yet to be increased, as the late Medical Congress of France recommend that no student of Pharmacy shall be eligible as a CANDIDATE for the diploma until he has acquired the *degree of Doctor of Arts!* a stringency well calculated to drive from the ranks all but learned men, but of doubtful utility, even in that scientific country.

English Pharmacy, on the contrary, has just awoke to a sense of her dignity, and the complex elements of our profession there, are but now assuming that order and consistency so long characteristic of her continental sisters. The whole medical body in England is marked with features not elsewhere discernible, being divided into four distinct divisions: the physicians, surgeons, apothecaries, and chemists and druggists. Pharmacy is conducted by two of these—the apothecary, who also practices medicine, and the druggist and chemist who has the same characteristics and duties as the apothecary of this country. The latter are the more numerous, and until recently were entirely without unanimity of action for mutual advantage. As might be expected, this body is composed of men of every degree of qualification, many of them second to none of their calling in the chief requisites, whilst the majority are individuals in

many respects illy fitted for the responsible duties they have assumed.

In 1840, on the application to parliament by the other medical bodies for a law to regulate the practice of Pharmacy, which bore hardly on the chemists and druggists, the latter, by one of those universal movements that sometimes occur in professions, as well as in nations, arose and assumed the initiative, organized a society, whose centre was in London, with ramifications in the chief cities and towns of England and Wales; founded a central, and, prospectively, several provincial schools of Pharmacy, and now present the noble spectacle of a flourishing, self-constituted institution, numbering 2500 members, with an annual income of over $20,000. Since their commencement, the society has issued a monthly Journal of transactions and scientific papers, which has a powerful influence on the members and others, by its open, unflinching advocation of correct principles and practice. In the past six years the difficulties that assailed its youthful endeavors have been boldly met, and many objections overcome; the school has been placed on a firmer basis, and a practical laboratory established. With the inherent energy of the English people, it is by no means hazardous to predict that in ten or twenty years a body of pharmaceutists will be raised up that will do honour to English Pharmacy.

It is a characteristic of our national and state governments to interfere as little as possible with the working of private interests, and competition is left unimpeded to control the business affairs of society. This liberty of action, so advantageous in the common intercourse of men, is unfortunate in reference to medicine, which, as no guarantee of qualification is required by law of its practitioners, is thrown open to any individual who chooses to adopt the title of doctor or apothecary, be he ever so ignorant.

When we look abroad in the land and witness the working of the complex systems of quackery, which, like the

miasma of an infected region, hover over every city and penetrate every village, leading thousands astray by hollow promises and lying certificates of cure, whilst legitimate means are neglected or overlooked, we cannot but desire that the strong arm of the law might reach forth and banish them from amongst us.

The only clear course that remains for us, is to enlighten public opinion through the agency of properly educated and skilful pharmaceutists, disseminated through the country, who will take a firm stand in upholding their profession from the polluting influence of empyricism, whilst they ennoble it by the cultivation of science.

You, gentlemen, are the future apostles of this great work of reform; on you will devolve in a season, the support of that cause, which, as students of Pharmacy, you have embraced; and I need hardly urge, therefore, the profound influence your present endeavors will exert on your future usefulness. Aim at the highest honour this College has to bestow—*its diploma;*—do not proceed within grasp of it and retire without making it your possession, as too many have done; but by an energetic course of study, make it your *right*, and enjoy the honorable satisfaction of *feeling that you have deserved it.*

ART. LXIX.—ELEMENTARY CHEMISTRY, THEORETICAL AND PRACTICAL. By GEORGE FOWNES, Ph. D., Chemical Lecturer, &c. Edited with notes by R. BRIDGES, M. D., Prof. of Chemistry in the Philadelphia College of Pharmacy, &c. Second American edition. Philada., Lea & Blanchard, 1847. pp. 460.

THE announcement of a new American edition of Fownes' Chemistry, so soon after the first, is a gratifying indication not only of the merit of the work, but of the increased demand for chemical literature in this country. An English reprint has not yet appeared, and the editor, in bringing out a new edition, has not had the advantage of those suggestions from the author of the work which are generally forthcoming with a reprint. In lieu of these, he has given evidence of a careful revision in the numerous notes that are appended to the text, elucidating some portions, extending others, and in several instances introducing substances overlooked by the author. The ammoniacal phosphates may be instanced as an example of the latter. One of these, the neutral phosphate, has come into use as a remedy and it is of some importance to know the characters which distinguish it from the acid phosphate, which is not possessed of the same medical qualities. The tartrate of iron and potassa is another instance; and indeed the work has been brought up to the present time by the introduction of the new facts announced since the former edition appeared.

Of the merits of the work as a text book, it is unnecessary to speak, having on a former occasion fully expressed our views. It is sufficient to state that the typography and paper are clear and good, whilst the already numerous diagrams have been increased. W. P. Jr.

ART. LXX.—PHARMACEUTICAL NOTICES.

By William Procter, Jr.

Note on the preparation of Hydrocyanic Acid.

The formula for hydrocyanic acid in the United States Pharmacopœia, was adopted by the revisers of that work from the last London Pharmacopœia. It is founded on that of Géa Pessina for the strong acid, and is the best and most economical of all that have been proposed.

The Pharmacopœia directs:

Ferrocyanuret of Potassium (yellow Prussiate of Potash) - - - - - - -	℥ij.
Sulphuric acid, - - - - - -	℥iss.
Distilled water, a sufficient quantity.	

The acid is mixed with four fluid ounces of the distilled water and poured into a glass retort. The prussiate of potash is then dissolved in ten fluid ounces of distilled water and added to the diluted acid. Half a pint of distilled water is poured into a well refrigerated receiver, adapted to the retort, and heat applied to the latter by means of a sand bath until six fluid ounces of liquid have distilled. The fourteen ounces of solution of hydrocyanic acid thus obtained in the receiver, is stronger than 2 per cent., and is directed to be diluted until 100 grains of it is of such strength as to accurately saturate 12·7 of nitrate of silver.

In remarking on this well established formula, it is with no view of changing it, but merely to suggest a few practical directions not found in the books, and the result of much experience. It may be observed that the directions of the Pharmacopœia in reference to the use of distilled water should be adhered to, at least so far as the water in the receiver and the water of dilution are concerned. Our Schuylkill water sometimes contains sufficient oxide of iron to cause, by standing, a minute deposite of Prussian blue in the acid. In a globular receiver it is difficult to tell just

when six fluid ounces of liquid have distilled, especially when the receiver is enveloped in the refrigerating liquid as it should be. It is more easy to judge by the decrease of liquid in the retort than by its increase in the receiver, as follows: After pouring into the retort the diluted sulphuric acid, introduce the solution of prussiate with the exception of six fluid ounces, and when the retort is in position for the distillation, mark with slips of pasted paper the level on either side. The reserved solution is then introduced, and the process proceeded with until the level of the liquid in the retort is marked by the pieces of paper.

The heat should be applied with a sand bath, as direct heat almost invariably causes violent concussions due to the insoluble Everitts' salt formed, and which cause the projection of the colored liquid into the neck of the retort and thus contaminate the product. A sheet iron bowl of rather greater diameter than the retort filled in with sand between, is the best arrangement when lamp or gas heat is used.

The object of placing water in the receiver is to absorb the vaporous hydrocyanic acid at first liberated, which would otherwise, unless the refrigeration was very complete, rupture the luting or the vessel. In addition to the receiver, the neck of the retort should be kept cool by a constant stream of cold water, unless, indeed, a Liebig's condenser is used, which is greatly preferable.

The most difficult step in the process, and that involving the most care, is in ascertaining how much water of dilution the distilled product requires to reduce it to exactly the strength of two per cent. The Pharmacopœia merely gives the direction to add as much distilled water as is sufficient to make 100 grains accurately saturate 12·7 grains of silver, a direction very difficult to follow literally, and then requiring repeated trials. It is much better to base the calculation on the quantity of cyanide of silver produced by an acid of the strength sought, which is *ten grains*. All that is necessary is to weigh 100 grains of the stronger acid from

the receiver, add to it a slight excess of solution of nitrate of silver, and wash the precipitated cyanuret until pure. It is then dried by pressure between paper and exposure to a heat of 212° Fah. and weighed. Every ten grains of this precipitate is equivalent to two per cent. of anhydrous prussic acid, and the amount of water of dilution is readily obtained by a simple sum of proportion, viz.: Suppose the precipitate weighs 13½ grains, proceed thus: if 13·5 grains of cyanuret are produced by 100 grains of the stronger acid, 10 grains of cyanuret will be produced by 74 grains of it, hence every 74 parts of the solution of prussic acid in the receiver requires 26 parts of water of dilution, which is readily converted into fluid ounces by the following statement: 74 : 26 :: f. ℥14 .. f.℥4 f. ℥7 ℏ 21, which is nearly that stated in the formula.

As there is great liability to variation in the strength of the product of the distillation, this experimental essay is always necessary, and hence the language of the Pharmacopœia—"five fluid ounces, or as much as may be sufficient."

The above directions are chiefly intended for those who manipulate with the small quantities of the officinal recipe; but, in making large quantities of the acid, it is better to use less water with the materials in the retort, which demands a smaller amount of distilled liquid, and yields a a stronger acid. I am in the practice of obtaining an acid of 5 or 6 per cent., and diluting in accordance with the above mentioned plan.

If any of the acid contents of the retort are thrown over into the receiver by concussion, the subsequent testing cannot be depended on, as a portion of the precipitate will be sulphate of silver. To prevent this, a deep retort should be used.

A word in relation to stopping the vials: These should be of the capacity of one fluid ounce, glass stopped, and after introducing the acid, the cavity of the neck should be wiped dry, and the stopper pressed firmly into its place,

after covering it near the middle with a thin layer of stiff cerate. Before tying over the vials, a small piece of putty should be put around the stopper joint, which greatly adds to the security of the acid. The presence of ammonia causes rapid decomposition in this preparation, and hence in the materials and subsequent manipulation this agent should be avoided. It should be excluded from the light.

Fluid Extract of Rhubarb.

In the last number of this Journal, a formula for fluid Extract of Rhubarb was suggested, by which a concentrated solution of the soluble portion of rhubarb may be obtained, with sufficient sugar to act as a preservative. As the *Extract* has since been employed by several physicians with advantage, it has been thought best to recommend the addition of aromatics to prevent the griping tendency of this, in common with other simple preparations of the drug. Half a fluid ounce of tincture of ginger, holding in solution ten drops or more of volatile oils, as anise, fennel, etc., to half a pint of the fluid Extract, will be sufficient.

Tinctures of Aconite and Wines of Colchicum.

Some very judicious remarks were made in the October number of the *Pharmaceutical Journal*, under the caption of "Random Prescribing," showing the extreme looseness with which some English physicians prescribe active remedies for which no standard formulæ exist—or in cases where several preparations of the same plant, or of different parts of the same plant, are in use. The Editor observes: "If it be asked how such remedies should be prescribed, the answer is plain: Give the formula for the tincture, solution, etc., at the top of the prescription—a practice usually adopted by some medical men; or publish the formula, and refer to the Journal or other work in which it is published, stating on the prescription the volume and page where it may be found. The former is the most unexceptionable

plan, and surely the trouble of writing two extra lines on a prescription should not be considered a hardship when the life of a patient is at stake."

These remarks have an *American* application, and, it may be said, a Philadelphia one, as almost every apothecary will vouch for, and give evidence of, on his prescription file, and they have been considered a fit preface to the following observations:

We have but one tincture of aconite officinal in the United States Pharmacopœia, whilst two, if not three, are in use. The officinal tincture is made by treating four ounces of the leaves of aconite with two pints of diluted alcohol. Another tincture, (that of Dr. Turnbull) is made by digesting ℔j. of aconite root in ℔iss. of alcohol; whilst a third tincture contains the root in the proportion of one part to four parts of alcohol. The high price of aconitia is well known. The concentrated tincture above noticed is used as a substitute for it, and when carefully prepared is a very good one. It is chiefly applied externally, although occasionally prescribed as an internal medicine. Now the object of this notice is to call attention to the fact that tincture of aconite is prescribed under the names of "Tinctura Aconiti fortis," "Tinctura Aconiti Radicis," and sometimes as simply "Tinctura Aconiti," when the strong preparation is intended. Dr. Keating of this city states, that in doses of three drops repeated three or four times, it has produced temporary paralysis of the lower extremities, whilst thirty or forty drops of the officinal tincture are given at a dose. The consequence of substituting the strong for the weak tincture internally, would be fearful, and calls for the serious attention of physicians and apothecaries.

In reference to the concentrated tincture made ℔j. to ℥ss. the results obtained by M. Personne with other substances, leads to the belief that the root is far from being exhausted, and that a tincture made of half the quantity of root is equally strong. It is a point worthy of examination.

Another case is the very common habit with some practitioners to direct "Vinum Colchici," without specifying whether the wine of the root or seeds is desired. There cannot be a doubt but that half a pound of the root or cormus of colchicum, possesses more activity, and yields more power to a pint of wine, than two ounces of the seeds, and that their indiscriminate use is improper. Hence the importance of physicians using exact terms when prescribing them.

Citrate of Magnesia.

Our last number contained an article on the Citrate of Magnesia, and a purgative water made with that salt. The advantages proposed by the use of this salt, are chiefly in its being in great measure devoid of the bitter taste of the sulphate. Its sparing solubility is an objection to its use, were its expensiveness less. The purgative water is the form in which it has been most used, which is a solution of the salt in carbonic acid water, with syrup. The process of Delabarre is a tedious one, and has been improved upon both here and in France.

Our friend, Edward Parrish, of this city, prepares the "water" by forming a slightly acid citrate of magnesia, (about 1½ oz. of the salt to a pint of water,) which is introduced into ordinary Saratoga water bottles, containing the requisite quantity of lemon syrup, until nearly full, and the remaining space filled with moist, recently precipitated, carbonate of magnesia, after which the bottles are immediately and well corked. Upon mixing the contents of the bottle, the carbonate of magnesia is decomposed by the free citric acid in the solution, and the evolved carbonic acid is retained by the close cork and absorbed by the liquid.

M. Duclou suggests that a solution of any suitable strength of the magnesian citrate in hot water, be introduced into pint bottles containing the syrup, and after cooling, a dram of bi-carbonate of soda, and afterwards a dram

of powdered citric acid, be added and the bottle well corked.

M. Bardet of Valençay suggests the following:

Sub carbonate of magnesia,	5¼ drams.
Citric acid,	5½ "
Lemon Syrup,	2½ "
Water sufficient to fill a seidlitz bottle.	

Dissolve the acid in one-sixth of the water, triturate the carbonate of magnesia with the remainder, and add to it half the acid solution, and when the effervescence has ceased, pour it in the bottle with the syrup, and then add the rest of the acid solution and cork instantly.

M. Massignon of Paris, recommends after introducing the solution of citrate into the bottle, to add first 75 grains of recently precipitated carbonate of magnesia, and then 105 grains of citric acid in crystals, and cork quickly.

MM. Garot, Marchand, and others have suggested formulæ differing but little from the above; in fact a perfect mania appears to exist in Paris for this substitute for Epsom salt.

Whilst the citrate of magnesia has found so many advocates in France, several writers have appeared in favour of the *tartrate*, which is stated to possess the same purgative power, and to be equally devoid of bitterness. M. Aviat directs 5 parts of tartaric acid to be dissolved in 80 parts of water, and one part of recently calcined magnesia, suspended in 5 parts of water, added.

A paper on a method of depriving Epsom Salt of its bitter taste, will be found in another part of this number.

REVIEW.

ART. LXXI.—ADULTERATIONS OF VARIOUS SUBSTANCES USED IN MEDICINE AND THE ARTS, AND THE MEANS OF DETECTING THEM, INTENDED AS A MANUAL FOR THE PHYSICIAN, THE APOTHECARY, AND THE ARTISAN. By Lewis C. Beck, M. D., Professor of Chemistry in Rutger's College College. New Jersey, and in the Albany Medical College, &c. New York, 1846. Samuel S. & William Wood. pp. 333.

Adulteration of medicines has become a crying evil in this country, for a long time it has been permitted to increase in silence, darkness, and obscurity, until it has assumed the dimensions of a hydra-headed monster, formidable because gigantic, and difficult of eradication because its vitality is so multiform. The community seem at length to have aroused from a state of apathy for its own protection, as foreigners, no doubt perceiving the facility with which home-made fraudulency is tolerated, have desired to participate in the profits, and have commenced to glut the market with vile and worthless preparations. The whole secret of such imposition, as that involved in the sophistication and adulteration of drugs and medicines, does not lie solely in the desire to obtain large gains, it has also its foundation in a morbid, pernicious practice, ultimately destructive to all trade, of cheapening every article to the utmost limit of reduction, and a general ignorance on the part of the public, and even of those through whose hands the public are made to suffer. There is a fixed standard of value for every thing genuine, which in some articles is known to every one, and is not to be deviated from, as for instance for the precious metals, and to expect to obtain a pure preparation of such at half the cost of the metal itself, is as absurd as to expect to appropriate the standard coins for half their value. Where nitrate or

cyanide of silver are sold for less than the metal required to prepare them, such transaction is a collusion between the seller and the buyer for after imposition. With respect to foreign articles of import, although some variation may occur according to demand, supply, impediments in trade, &c., yet for the time being there is a fixed value for them, and it may be laid down as an axiom, that *where there is the least price there is the least value.* Good drugs cannot be bought for less than they are worth, and first hands may benefit, but second or third hands must suffer. To buy worthless trash is presuming on the ignorance or confidence of the consumer. We are rejoiced at length to find, that our Colleges of Pharmacy have seriously taken up the subject. We sincerely hope that their deliberations and movements will be of benefit to a much-injured public.

The design of Dr. Beck's Manual is to diffuse information to all who are interested in this department of science, and as it is the first professed treatise on adulteration in the United States, thereby separating this branch from the vast accumulation of details contained in the books on drugs generally, it may be regarded as a pointer in a constellation. As stated in his preface, he has borrowed his information from all sources from which it could be procured, and hence the treatise is an authentic, authoritative compilation of the knowledge of the day. The first part of it is devoted to simple substances and manufactured articles, arranged in alphabetical order, the nomenclature being that of the Pharmacopœias, with the common appellations appended. Each article is succinctly described in the pure state, to which are added the modes of sophistication and the means of detecting it. The second part is devoted to "Operations and Instruments employed in Quantitative Analysis," to which are added "Tables containing the behaviour of some reagents with the more important metals." The "Index" is a full one. The convenient form of this book, a duodecimo, renders it easy to carry and to use, and we highly recommend it to pharmaceutists and physicians, who are in

the habit of purchasing drugs in the gross. If we have any fault to find with the Manual, it is a want of specification of the relative quantities of the elements in each compound, as directed by the authorities that are followed. The account of the articles is too cursory and not sufficiently specific, and again it does not enter into officinal preparations; this perhaps belongs more strictly to the materia medica than contemplated by Dr. Beck, but is of great importance in guiding the dealer and medical man. For instance, blue pill is but cursorily treated of, and yet it is as varied in strength and preparation as possible, containing from ten to thirty per cent. of the metal, and so of others. If the present edition should shortly be exhausted, we hope the author will extend the sphere of its subjects and thereby its usefulness. J. C.

ART. LXXII.—ON THE ANTI-SEPTIC AND DISINFECTING POWERS OF CHLORIDE OF ZINC AND NITRATE OF LEAD.

THE English journals have been busy of late in discussing the relative and absolute merits of chloride of zinc and nitrate of lead, as anti-septic and disinfecting agents. It appears that in the year 1840, Sir William Burnett, Director General of the Medical Department of the British Navy, took out a patent for preserving animal and vegetable substances by means of chloride of zinc, and its application was directed entirely to the prevention and suspension of decay. Since then the patentee has brought his liquid before the public as a disinfectant applicable to destroy deleterious and offensive effluvia, such as those of a contagious character in fever hospitals, etc.

More recently, a preparation called "Ledoyen's disinfecting fluid," has been brought into notice, which is represented to "possess the property of destroying the offensive effluvia of cesspools, drains, sick rooms, &c., and preventing the spread of contagious diseases." It was the design of M. Ledoyen to submit the merits of his "fluid" to a committee of Parliament that if substantiated he might receive a reward from government, for divulging the composition of his preparation. He refused, meanwhile, to place the disinfectant in the hands of any party who did not obligate himself not to examine it; but the editor of the Pharmaceutical Journal having obtained posesssion of a specimen, without this condition, he states it to be a solution of nitrate of lead, which has since been acknowledged by the parties.

The anti-septic power of chloride of zinc, has been too fully established in the dissecting rooms of this city to need comment—but in reference to the more important power of a disinfectant that has been attributed to it, there is much doubt. The disinfecting action of both the substances is

founded on the premises, that hydrosulphuric acid is the cause of contagion and fœtor, in the miasm and exhalations from decomposing animal matter, the truth of which is by no means perfectly established, else, as Mr. Bell observes, why do not the occupants of our laboratories become diseased through its influence. Admitting that sulphuretted hydrogen is the noxious agent to a certain extent, the question arises, are these salts efficient in decomposing and neutralising its effects?

Chloride of Zinc.

If neutral chloride of zinc be treated with sulphuretted hydrogen, but a small part of the salt, will undergo decomposition forming sulphuret of zinc and hydro-chloric acid.

The presence of free acid in solutions of zinc salts, prevents their decomposition by the gas, and hence the disinfecting action of the solution is destroyed.

Nitrate of Lead.

If nitrate of lead be treated with hydrosulphuric acid, sulphuret of lead will be formed and nitric acid and water be set free.

As the salts of lead are decomposed by the gas in question, in the presence of free acid, the disinfecting action will not cease till all the salt has been decomposed

The conclusion arrived at is that chloride of zinc has very decided powers as an anti-septic—whilst nitrate of lead is far more efficient as a destroyer of noxious effluvia containing sulphur.

In reference to Ledoyen's solution, the discoverers speak of its powers in the following terms:

1st. "It disinfects night soil, not destroying but increasing vegetation, more particularly as regards agriculture; *completely preventing the disease in potatoes*, when the land is manured with disinfected night soil."

2d. "It disinfects hospital wards of miasma, also cellars, water closets, and buildings infected by impure gases."

3d. "It disinfects sailors suffering from fever on board

vessels; it will also disinfect ships at sea, and under quarantine."

4th. "It disinfects patients suffering with infectious disorders and wounds; also dead bodies, so that they may be kept nearly a month; also different parts of the body can be kept for the purpose of dissection, for coroner's inquests, &c."

Finally. "This process is most effectual as a sanatory remedy for towns, &c."

It may readily be conceived that a preparation promising such immense advantages to mankind, would attract the attention of government and the public. Accordingly, Lord Morpeth, as Commissioner of her Majesty's Woods and Forests, submitted the "fluid" to the deliberate examination of Dr. Southwood Smith, Mr. Toynbee, and Mr. Grainger, in connection with the discoverers, whose report was extended over many pages; but of which the following are the conclusions:

"1st, That this fluid does not possess any peculiar power in preserving the dead body from decomposition, and that, therefore, it is not applicable to any considerable extent to purposes of dissection.

"2. That it removes the fœtor of putrifying substances, vegetable and animal, by decomposing the sulphuretted hydrogen upon which that fœtor chiefly depends.

"3. That it is capable of preventing the disengagement of sulphuretted hydrogen in sick chambers, and in the wards of hospitals, and of removing it in a few minutes when it is present, not merely by dissipating the smell, but by destroying the poison.

"4. That the use of it is simple and easy, and as the occasions on which it is required are of constant occurrence, and as it has the peculiar advantage of being itself inodorous, its possession would be a comfort and blessing to private families.

"5. That by decomposing the sulphuretted hydrogen, it removes from night-soil the poison which renders such matters injurious to health and dangerous to life, and by changing the

ammonia from a volatile into a fixed substance, and thereby preventing its escape and loss, it preserves in the night-soil the principle which renders it chiefly valuable as a manure, while it presents that principle to the plant in a form which is known to be highly beneficial to vegetation.

"6. That, as it renders the removal of night-soil practicable without creating a nuisance, it ought, in our opinion, to be made a matter of police regulation, that no privy or cesspool should be emptied without the previous use of a sufficient quantity of it to destroy all offensive smell."

The reporters have evidently avoided the chief question at issue, and directed their answers merely to the action of the fluid on sulphuretted hydrogen, without noticing other deleterious gaseous exhalations or referring to the powers of the liquid in disinfecting miasmatic and contagious atmospheres. The following exposition of the case was submitted to the referees by Dr. Leeson of St. Thomas's Hospital, and is so clear in reference to the objects proposed to be accomplished by the discoverers, that it is introduced here without abridgement:

"The decomposition of animal and vegetable substances gives rise, as it is well known, to septic or infectious miasmata. Those arising from vegetable putrescence, generating disease and fevers of a remittent type, whilst those arising from animal matter are distinguished by a typhoid character.

"Such miasmata, although so dangerous, are not, it is believed, to be distinguished by the smell, and are most probably composed of vegetable and animal organizations so minute and subtle, as to elude the cognizance of those methods and instruments of investigation which have hitherto been employed.

"The fœtid and offensive gases or vapours consist of combinations of hydrogen with sulphur, phosphorus, nitrogen and ca rbon.

"The most offensive compounds are those of hydrogen with sulphur and phosphorus, forming sulphuretted hydrogen (or, as it is otherwise termed, hydro-sulphuric acid) and phosphuretted hydrogen gases.

"The ammonia resulting from the combination of hydrogen

and nitrogen, although odorous, can scarcely be termed an offensive compound, but being commonly combined with sulphuretted hydrogen, it then furnishes a highly offensive substance.

"The compounds of carbon and nitrogen forming cyanogen; of cyanogen and sulphur forming sulpho-cyanogen, and of carbon and hydrogen forming light carburetted hydrogen, may be reckoned amongst the less offensive, although volatile ingredients of the putrefactive vapours, but which combine to complete the farrago of unpleasant odours.

"The compounds of carbon with oxygen forming carbonic oxide and carbonic acid, although fatal to animal existence when too largely respired, can scarcely be considered as offensive compounds.

"To recapitulate: we may divide and distinguish the elements of animal and vegetable putrescent vapours thus:

Dangerous, but inodorous.	*Odorous, but slightly offensive.*	*Most offensive.*
Remittent miasmata	Ammonia	Sulphuretted hydrogen
Typhoid miasmata	Carburetted hydrogen	Phosphuretted hydrogen
Carbonic oxide	Cyanogen	Hydro-sulphate of ammonia.
Carbonic acid	Sulpho-cyanogen	

"Two methods naturally suggest themselves to the chemist by which such dangerous and offensive compounds may be destroyed or prevented.

"First. To alter or otherwise form their component elements into new elements, which are neither dangerous, fœtid, nor offensive.

"Secondly. To fix certain of the elements so as to render the substances themselves no longer volatile, and consequently neither odorous nor offensive.

"First Method. The principal re-agent heretofore made use of in the destruction of animal and vegetable miasmata and for the decomposition of the offensive compounds of hydrogen with phosphorus, sulphur, &c., is chlorine, the efficiency of which, is dependent on its great affinity for hydrogen, with which it forms hydro-chloric, or, as it is commonly termed, muriatic acid. Unfortunately chlorine is itself an offensive, irritating and corrosive substance, which will account for its not having been more extensively employed, although the cheap combination of

chlorine and lime is applicable as a disinfecting agent, and might, it is believed, be advantageously employed.

"Second Method, by Fixation. This method is chiefly applicable to the sulphuretted hydrogen, which may, as is well known, be decomposed by a great number of metallic salts. These salts consist of an acid in combination with the oxide of a metal. When sulphuretted hydrogen is passed through or added to a solution of one of the salts alluded to, its sulphur combines with the metal, forming an insoluble inodorous metallic sulphuret.

"The hydrogen combines with the oxygen of the metallic oxide, forming water, and the acid of the metallic salt is set free.

"With regard to the particular process of M. Ledoyen, the experiments conducted by that gentleman at St. Thomas's Hospital led to the conclusion that his process was founded on the second method before alluded to; namely, that of the fixation of the sulphuretted hydrogen by a metallic salt, and that the actual metallic salt employed was ——.*

"This opinion has been frequently verified by M. Ledoyen himself, who, in the most candid manner, not only admitted the composition of his fluid to be such as is here stated, but also delivered a bottle of it to Dr. Leeson for analysis and further experiment.

"In regard to its efficacy as a disinfecting agent, the general result of these experiments establish the conclusion that the efficacy of this process is confined to the removal of the unpleasant odours due to sulphuretted hydrogen and hydro-sulphate of ammonia. As the sulphuretted hydrogen is the most abundant and most offensive of the various products of animal and vegetable decomposition, it is evident that although this process cannot remove the whole of the offensive odours, it is still well suited to effect a very important and extensive amelioration of the nuisance arising therefrom.

"In regard to the application of this liquid as a dressing to putrescent sores, there can be no doubt that it will be found useful, and that it possesses several advantages over those in common use; among others, that it is itself inodorous, that it corrects

* This omission occurs in the Report, as here printed.

the fœtid exhalations arising from sores, and that it eliminates one of the most excellent applications to gangrenous sores yet known.

"In regard to the last and most important application of the disinfecting fluid to the removal of the fœtid and offensive odours arising from privies, cesspools, night-soil, &c., it will appear from what has been already stated, that so far as the offensive effluvia result from sulphuretted hydrogen and hydro-sulphate of ammonia, this liquid will totally remove them.

"The odour resulting from phosphuretted hydrogen, and from the other less offensive compounds, will still remain; but as these odours are neither so offensive nor so readily diffused to a distance as the sulphuretted hydrogen, a most important and beneficial improvement will be effected, particularly in the process of removal.

"It remains to consider what benefits or injuries may result from the employment of this liquid in respect to the subsequent use of the night-soil as manure.

"Two important advantages will no doubt be attained; the one, the conversion of a prejudicial and poisonous ammoniacal salt; viz. the hydro-sulphate of ammonia into an inodorous and highly fertilizing compound; viz., the nitrate of ammonia. The other advantage is, that by removing that poisonous and injurious compound, thereby saving the long and offensive exposure of the night-soil to the air, which would be otherwise necessary, and which is not only disagreeable, but, by the consequent loss resulting from the volatility of the ammoniacal salts, is also injurious.

"On the other hand, there is one problematical objection to the extensive applications of this fluid as a manure to land; namely that the small quantity of the metal employed may possibly, by its accumulation, be productive of ultimate mischief; but this requires further investigation and experiment.

"The above suggestions are made without any desire to detract from the merit due to Messrs. Ledoyen and Calvert, in having thus directed public attention to the use of chemical reagents as a means of removing a very serious and dangerous impediment to the sanatory condition of towns.

The above facts and statements are chiefly derived from

the editorial discussion of the subject, in the August and September numbers of the Pharmaceutical Journal.

It has recently been stated in our daily papers that the frigate Raritan, which had been abandoned at anchorage in the Chesapeake Bay, owing to the contagious miasm that infected her hulk since returning from the tropics, was entirely disinfected by the application of some disinfecting agent, the name of which was not mentioned. May it not be one of the salts in question, most probably the nitrate of lead? W. P. Jr.

ART. LXXIII.—ON A CHLOROMETRIC PROCESS FOR THE VALUATION OF BLEACHING POWDER.

By F. Grace Calvert, Esq.

(*Read before the Philosophical Society of Manchester.*)

The process to which I beg to call your attention is not entirely new, being Gay Lussac's method by arsenious acid, which I have transformed from the French system into the English, and, I hope, made it sufficiently simple to be employed by bleachers, or other persons not accustomed to much chemical manipulation.

It was the knowledge, proficiency, and precision required under Gay Lussac's method, which prevented the great majority of bleachers, even in France, from adopting it.

Let us throw a glance at the different methods which have been employed to test bleaching liquors. The first one was called *Bertholimetre*, from the celebrated Chemist, who was the discoverer of it, although it was first published in 1794 by a person of the name of Decroizilles. It was based on the power possessed by chlorine to destroy the colour of indigo. His standard liquors were made with one

part of indigo dissolved in nine parts of sulphuric acid, and the whole diluted with 990 parts of water.

In 1824, Gay Lussac greatly improved upon the system of Decroizilles, and called the process for testing bleaching powders *Chlorometry*.

His attention was chiefly directed to improvements in the method of producing the standard liquor, and in introducing apparatus of a simple construction, which, by their easy graduation and *handling*, rendered the process sufficiently easy for the practice of bleachers.

Though this method is still employed by nearly all the bleachers on the Continent, it is subject to serious errors; for instance, from the deterioration which the standard indigo liquor undergoes in time, and which consists in its gradual loss of strength.

A second disadvantage, not less to be noticed, is a want of the knowledge of the exact time when the process is ended.

It was owing to these principal difficulties, combined with some minor ones, that Gay Lussac was induced to search for some more accurate process, and after many years' trial he published, in 1835, three new standard liquors, which shall be noticed after our attention has been directed for a short time to the system generally followed in this country.

"It is one in which the chlorine is determined, by finding what quantity of the chloride of lime to be analysed is required to convert a known weight of the *protoxide* of iron into *peroxide*. For this change protoxide of iron requires half an equivalent of oxygen, which is supplied in the present process by the decomposition of half an equivalent of water by the chlorine of the chloride of lime.

"Half an equivalent of chlorine, therefore, or 221.8 parts, effects this change upon a whole equivalent, or 439 parts of protoxide of iron, which quantity of protoxide is contained in one equivalent, or in 1728 parts of crystallized protosulphate of iron. Therefore, 221.8 parts of chlorine can per-

oxidize 1728 parts of crystallized protosulphate of iron (or 10 grains of chlorine can peroxidize 78.1 grains of the crystallized protosulphate.) Now the process consists in discovering how much of the specimen of the chloride of lime is requisite to peroxidize 78.1 grains of the protosulphate, which quantity of the chloride must contain 10 grains of chlorine.

"In the first place, 78 grains of the pure protosulphate (clean crystals of the salt dried by strong pressure between folds of cloth) are dissolved in about two ounces of water, and the solution is acidulated by a few drops of hydrochloric or sulphuric acid. Fifty grains of the chloride of lime are weighed out, mixed well in a mortar with about two ounces of tepid water, and the mixture poured into an alkalimeter. The measure is filled up to O, with the washings of the mortar, and the liquids are well mixed by agitation, the mouth of the alkalimeter being closed by the palm of the hand. This solution of chloride of lime is then gradually added to the solution of 78 grains of protosulphate of iron, until the latter is completely peroxidized, which is discovered by means of the red prussiate of potash. This salt gives a precipitate of Prussian blue with a salt of the protoxide of iron only, and not with a salt of the peroxide; so long then as it produces a blue precipitate, protoxide of iron still exists in solution, and more chloride of lime must be added. In applying red prussiate as the test, it is convenient to have a plate spotted over with small drops of its solution, which are touched with a drop of the liquid to be tested, taken out on the point of a glass stirrer, stopping short exactly at that point at which the red prussiate of potash ceases to afford Prussian blue.

"The number of measures poured from the alkalimeter is carefully observed. The richer in chlorine the specimen of chloride of lime is, the less, of course, is required. As this amount, whatever it may be, but which, for example,

we will suppose to be 70 measures, contains always 10 grains of chlorine, it becomes a simple matter to calculate the per centage of chlorine in the specimen."

This mode of operating offers some serious inconveniences, and is productive of error.

The first is, that it is very difficult to have pure sulphate of protoxide of iron, for it oxidizes with great facility; and unless in the hands of a chemist, or one well acquainted with its nature, great errors may arise in employing it as a standard.

A second objection arises from the necessity of having the salt in a fit state of dryness, which is not easy to be ascertained by a commercial person; and lastly, the disadvantage of not being able to judge with promptness the exact point when the oxidation is complete.

This is why I would employ Gay Lussac's method, whose standard liquors can be kept a great length of time without undergoing any change; and further, because we are enabled readily to perceive the instant of saturation, either by natural or artificial light.

This system is founded on the readiness with which *arsenious acid* is converted into *arsenic acid*, under the influence of chlorine, which in decomposing water gives rise to hydrochloric acid, and the oxygen acting upon the arsenious acid transforms it into arsenic.

The plan pursued consists in dissolving arsenious acid in hydrochloric acid, and then diluting this acid with water until a given volume of chlorine, say a litre, will transform an equal volume of this solution of arsenious acid into arsenic.

Here lies the difficulty which prevents this method from being popularised, because is requires much experience in manipulation to get exactly a given volume of chlorine in an equal bulk of water, none but a Chemist, or those having much practice, could attain this object by Gay Lussac's method. One of his plans is to prepare a quart of chlorine,

and to have it slowly dissolved in a weak solution of potash, which object is obtained by dipping the neck of the bottle in the alkaline liquor, withdrawing the cork and allowing the liquid to flow in slowly. This method requires time and two or three complicated calculations.

His second plan is to prepare a quart of chlorine with a pure peroxide of manganese, or a manganese whose quality is known. But here again a difficulty presents itself to persons engaged in business, and it is here where I hope that I have been enabled to introduce a real improvement, by simplifying it to such a degree as to render it easily practicable to any one.

My method is to take a solution of chlorine of an undetermined strength, of which I easily determine the quantity of chlorine dissolved by pouring in a given quantity, say one cubic inch of standard liquor, made of 10 grains of pure silver, dissolved in pure nitric acid, and then diluted with water, so as to occupy 1000 grains; consequently each hundred grains of solution contains one grain of silver. Now, by the quantity of solution employed to form with the chlorine, chloride of silver, I can very easily ascertain the quantity, in grains, of chlorine that my solution contains in a determined bulk.

This method is very accurate, for it is well known how great is the insolubility of the chloride of silver, and the sensibility of its re-action. Owing to the heavy weight of the chloride, the liquid is rapidly cleared, whereby it is easily ascertained when the action is completed. By having two or three tubes filled with chlorine, the value of the chlorine solution may be readily tested to a very great nicety. Knowing that 5.1 grains of chlorine will transform seven grains of arsenious acid into arsenic acid, a standard liquor may be made of arsenious acid which will exactly contain seven grains of arsenious acid in 1000 grains of water.

This method of making a standard liquor is only neces-

sary when great precision is required; but for commercial purposes, when the determination of a bleaching liquor to half or one per cent. of its real value, is quite sufficient, a standard liquor can be obtained by dissolving seventy grains of pure crystallized arsenious acid in one ounce of hydrochloric acid, and then diluting the whole with a sufficient quantity of water to give a total of 10,000 grains, consequently 1000 grains of distilled water will contain seven grains of arsenious acid, which will require 5.1 of chlorine to transform it into arsenic acid. This method of operating is very simple and easy, a fair sample may be taken from a cask from which fifty grains are weighed, to be well mixed with water in a mortar, and then poured into a 1000 grain measure, divided into one hundred divisions, or in other terms into an alkalimeter; the measure is then filled with the washings of the mortar up to the O of the instrument, so that each division will contain half a grain of chloride. If great accuracy is required, a given quantity of the liquid must be poured into a chlorimeter tube, which may indicate in tenths each division of the alkalimeter. On the other hand, there must be put into a vessel, with rather a narrow mouth, 1000 grains of the arsenious acid liquor, which contains seven grains of this acid, and which will indicate 5.1 of chlorine. This solution is coloured by a drop of sulphate of indigo, and whilst giving the liquor a revolving movement in the left hand, the chlorine mixture must be poured with the right.

When the blue colour becomes weak, a fresh quantity of blue must be added, and then proceed to add with great care the bleaching liquor, as the end of the operation is near, which point is indicated by the immediate disappearance of the blue colour.

To prevent the error of about from 1 to 2 thousandth, which the two drops of indigo may have introduced in the essay, a second operation is begun by pouring into a new portion of arsenious liquor, the quantity of chloride solution

which is *nearly* requisite for the operation, and it is only *then* that the drop of blue sulphate of indigo is added. The number of measures employed is carefully observed. The richer in chlorine the specimen of chloride of lime proves, the less of course is required. To know the per centage which the number found indicates, the following method is adopted:—

Suppose that twenty-five divisions have been employed, which indicate 5.1 of chlorine, it must be calculated how many times the number of divisions employed will go in 100, namely, four times; then by multiplying 5.1 by 4, the result is 20.4 grains of chlorine, per cent. Should 20 divisions be used, 100÷20 gives 5; then 5.1 by 5 indicates 25.5 grains of chlorine per cent., and so on for any other number found.

In addition to the advantage of determining with ease the exact moment when the operation is at an end, this method affords, after a little practice, a very rapid mode of ascertaining the value of a bleaching liquor, and of being able to prepare a large bulk of standard liquor, which, by its non-deterioration, can be employed with safety for a long period, for by taking one thousand grains of it the value of a bleaching liquor can be determined in a short space of time.

M. Gay Lussac also proposed the employment for standard liquors of the yellow prussiate of potash, and the nitrate of mercury, transformed by a little chloride of sodium into protochloride; but standards made with those substances are in time susceptible of undergoing changes, which might lead to errors, besides, like the protosulphate of iron, they do not present a rapid indication of the moment when the operation is completed.—*Pharm. Jour.*

ART. LXXIV.—EXPERIMENTS ON VALERIANIC ACID.

By Dr. L. Aschoff.

Rabourdin was the first who discovered that the dried root of valerian yields a greater proportion of valerianic acid if, during distillation, some sulphuric acid be added to the water and Dr. Riegel verified this observation.

Dr. Aschoff, when examining these statements, certainly also obtained a large quantity of this valerianic acid, namely, from 15 pounds of the root 18 drachms and 2½ scruples, and at the same time the distilled water was still so acid, that several ounces of crystallized carbonate of soda were saturated by it. This fact induced him to suspect that the liquor must contain, besides valerianic acid, another acid. In order to convince himself of this he distilled a fresh portion of valerian root with water, without the addition of acid, until the last distilled portions no longer offered an acid reaction. The acid obtained was only valerianic acid. Upon this the residuary root in the still was mixed with 4½ ounces of sulphuric acid and again distilled. This second liquor reacted again strongly by acid, and required about five ounces of carbonate of soda to saturate it. The soda salt thus formed contained acetic and formic acids. Both these acids are fixed by lime in the root of valerian, and hence they remain in the residue, if the root be only distilled with water. The addition of sulphuric acid, therefore, in the distillation of valerianic acid is not advisable.

Dr. A. found, moreover, that if the root had only been distilled with water, the residue in the still always retains a strong acid reaction, which arises from some resinous substance and free malic acid.

The time of gathering and the age of the root have an essential influence upon the quantity of the valerianic acid yielded. The author found that the root, which had been

gathered in the spring in dry places, dried and preserved for a few months, yielded the largest proportion of valerianic acid.

Dr. Riegel says, the *crystallized valerianate of ammonia* can be sublimed; but Dr. A. did not succeed in this, even after repeated experiments. The valerianate of ammonia is best obtained by saturating the oily acid with dry ammoniacal gas, and then applying a gentle heat in order to remove the excess of ammonia.

The valerianate of ammonia thus obtained forms white feather-like crystals, having a feeble acid reaction. As long as the fluid saturated with ammonia does not colour the litmus red, no crystallization ensues. The crystals, heated in a retort, melt at 25° R. without developing ammonia. On applying a greater heat a white vapour rises which colours litmus red, and condenses on cooling into oily drops, which even after many months do not yet show a disposition to harden. If the crystallized valerianate of ammonia be heated in dry ammonical gas, the atmospheric air being excluded, small crystals form on cooling, which melt again on the access of air. The valerianic acid appears according to this to form with ammonia two combinations, which have not yet been analysed.

Ibid, from Buch. Reper.

ART. LXXV.—ON THE MANUFACTURE OF ARTIFICIAL GUM

By M. Emile Thomas.

During a lengthy stay in England, I had occasion to occupy myself with the manufacture of artificial gums. The facts which I collected, either from my own observations or from official communications, may, I trust, prove somewhat interesting to the Society of Encouragement, and I therefore hasten to communicate the same.

Since the discovery of diastase by Messrs. Payen and Persoz, and owing to the successful applications, made by the former of these gentlemen, of the various products from starch under the influence of that powerful reagent, a new discovery has been made in this branch of industry, viz., dextrine or artificial gum.

During the last two years, especially, the manufacture of dextrine has made immense progress in France, England, and Germany. I will not here recapitulate the various uses to which this product may be advantageously applied; but I would observe, that the rapid development of a new branch of industry nearly always occasions, as in the present instance, the substitution of an economical product, of an easy and quick manufacture, for an expensive product, obtained by an uncertain manufacture.

In this case dextrine has replaced exotic gum for nearly all the purposes to which it was applied.

Dextrine is now met with in commerce in three distinct forms, viz., in the form of a white, brilliant, and pearly powder; as a syrupy solution; and in the form of exotic gum, in greater or less perfection, either broken into small fragments, or made into rolls of various sizes.

Some short time ago, dextrine was only produced in the state of powder; and if some manufacturers have sought to give to it the appearance of the product for which it is to be substituted, they may have been induced to do so from the conviction that the only way to supersede the old plan was by humouring and even deceiving its disciples with the outward appearance of the new product. In this way our learned professor, M. Payen, who was formerly a manufacturer of some eminence, introduced borax of French manufacture, by giving it the dusty appearance of the Dutch crystals of borax, rounded and polished by the friction during their conveyance.

It has since been discovered that the gummy form of dextrine possessed many great advantages not at first con-

templated. I shall allude to this presently, but would first observe, that there appears to be one disadvantage attending this form. Some intelligent persons were apprehensive that, taking advantage of the resemblance, exotic gum would be adulterated with artificial gum; fortunately this is impracticable, as the smell and taste of potato oil, which is always given out by artificial gum, are sufficient to betray its presence; and thus, if the purchaser suspects a fraud, he can easily detect it.

Dextrine may be manufactured either by the use of acids, or by means of the diastase contained in malted barley. I will examine these various processes in succession.

By Sulphuric Acid.—The dextrine produced possesses the disadvantageous property of being deliquescent, *i. e.* absorbing the humidity of the atmosphere. This method is therefore never employed, as, besides this disadvantage, the products are often coloured.

By Nitric Acid.—This method is now most generally followed for obtaining dextrine in the state of powder. I have thought proper to observe on this head, that the acid employed must be perfectly pure, and for this reason—that nitric acid, as is well known, is obtained by the decomposition of nitrate of soda, obtained in the natural state from the coast of Bolivia, by means of sulphuric acid; now this salt always contains a portion of sea salt, which, together with the sulphuric acid and nitric acid, generates chlorine. Although but a small portion of this chlorine is contained in the acid, and consequently in much less proportion in the dextrine produced by that acid, it is nevertheless sufficient to considerably diminish the brilliancy and depth of the colours prepared with the dextrine. Several printers upon paper and fabrics have observed this, without being able to account for it otherwise than by attributing it to the inferior quality of the gum.

By Hydrochloric Acid.—This process is only employed to my knowledge by Messrs. Saint Etienne, who first render

the starch soluble, as in the former process, by means of a small dose of acid, and by torrefaction or rather desiccation, at a high temperature.

The powder thus obtained is afterwards thrown upon a metallic sieve, and submitted to the action of a jet of steam, which damps the dextrine to such an extent as to render it transparent without liquefying it; so that it will require but very little drying afterwards. This process possesses the disadvantage of requiring great ability on the part of the workmen charged with the hydration of the dextrine. The manipulation necessary for this operation is not acquired without great difficulty; so much so, indeed, that M. Saint Etienne, jun., who directs the working of his process in England, has not yet been able to find any person capable of undertaking this part of the work. Messrs. Saint Etienne prefer to use hydrochloric acid.

By Diastase.—This process seems the most worthy of attention in all respects; as, by adapting to it some modifications, which I have tried on a large scale, it will be found to be the one giving the most perfect results. I will therefore describe it fully.

The fecula must be rendered soluble in vats, heated by steam in such a manner that the temperature may be easily raised or lowered. The fecula is first mixed with 4 times its weight of water, previously heated to about 122°; for this purpose the fecula is gradually introduced into the vessel or boiler containing the hot water. In London, I employed copper boilers, with a double bottom, capable of containing about 400 gallons; and at one operation, about 600 lbs. of fecula, mixed with 1200 quarts of water, were decomposed. The temperature must be kept at about 140° until the whole mass is converted into starch; 2 per cent. by weight of very white malted barley must then be added, and also the mucilage produced from 1 per cent. of linseed.

If a greater proportion of malt than that which I have mentioned were added, the decomposition would doubtless

be more rapid; but a larger quantity of glucose would be formed, and the gum would be more coloured. With regard to the utility of the mucilage of linseed, it imparts tenacity to the gum. Instead of this substance I attempted to use lichen; but it did not answer, although the products were much whiter, by reason of the mucilage depositing itself upon the sides of the boiler, and preventing the liquid from boiling. It is, besides, not so strong as the linseed mucilage.

The mixture must be kept at a temperature of about 122° or 140° until all the starch is again dissolved; the temperature should then be suddenly raised, taking care however not to exceed 167°, but keeping as near that temperature as possible, in order to cause the diastase to act as powerfully as possible. It will then be necessary to stir the mixture well until the decomposition is almost complete; this may be ascertained by the deep blue tint the mixture assumes, and by the action of the solution of iodine, which in that case will colour the dextrine of a violet, approaching to red, without any mixture of blue.

It is unnecessary to say, that, during the decomposition, the liquid must be kept constantly in motion. The operation lasts about an hour and a quarter; that is to say, a quarter of an hour for the formation of the paste, one for its dissolution, and the other three-quarters for rendering it soluble.

I much prefer this method of forming the paste to adding the malt, as the reagent spreads much more uniformly throughout the mass, and does not at once fall to the bottom of the vessel in which the operation is performed.

The liquor must now be removed from the decomposing vats, and left in pans to settle for from 6 to 18 hours, according to the external temperature. During this time a slight fermentation will be perceptible, but it must be checked by adding alum in the proportion of 10 grms. for every 25 gallons of liquid. It is essential to allow this time for the mixture to settle, as it prevents two serious evils: viz, the colouring of the gum while baking, and a singular

phenomenon so often observed in evaporating viscous liquids, viz., their being quite still, and which I have ascertained is caused by the formation of a very thick sediment on the sides of the evaporating vessels.

The liquor, when drawn off after settling, will mark about 10° B., and it is evaporated by raising it very slowly to the boiling-point; which precaution is indispensable, for the perfect clarification is accelerated by checking the first boiling, as in refining sugar. This clarification is effected without any foreign agent, by the coagulation of the vegetable albumen contained in the malt and the linseed mucilage. As scum will continue to rise to the top of the mucilaginous syrup during the most of the time of baking, it will be necessary to remove it carefully; and if the boiling is too much accelerated, the gum will first become thick, and afterwards will be coloured. When a solid pellicle of gum is formed at the surface of the syrup, the baking will be completed, at which time the syrup will mark about 35° B.

If it be desired to keep the gum in a liquid form, the baking must be stopped at 30° while boiling; the syrup must then be poured into well-closed vessels, previously rubbed with oil of turpentine, and the surface of the gum covered with a thin layer of that oil. This method succeeded pretty well for preventing the fermentation of the liquid gum.

When it is desired to solidify the gum, the boiling syrup is poured into small flat tin vessels, placed upon a hot air stove, kept at a temperature of from 72° to 90° F. At the end of 24 hours the gum will acquire the consistency of jujube paste; it is then cut up into small oblong pieces with a pair of shears, and these pieces are rolled out upon a polished table, with a wooden roller, dusted with pulverized artificial gum, and afterwards placed upon wooden frames, and left for three or four days to dry. The gum would be much better dried by letting the syrup run upon a cylinder heated to 110° or 120°; but the economy of this process is ques-

tionable. The artificial gum thus prepared is easily dissolved, and makes a very clear solution; over dextrine in the state of powder, it possesses the advantage of being more readily packed; and over liquid gum, the advantage of not fermenting.

The experiments which I have made with the various products of starch have led me to other inquiries upon analogous substances, and principally upon ligneous fibre and cellular tissue, which, as is well known, according to the experiments of M. Payen, are of the same composition as starch. At a future meeting I hope to communicate to the Society the results of some experiments upon the steeping of textile fibres, by means of processes analogous to those employed in manufacturing dextrine or sugar.

I will conclude by some observations upon an improvement which may be introduced in the manufacture of starch by washing. In the manufactory at Habertonford Mills, in the county of Devon, where M. Saint Etienne is superintendent, he is occupied in the production of starch by M. E. Martin's process, which consists, as is well known, in washing the paste obtained by means of wheaten flour under the action of a current of water and a mechanical softener. For this process it is essential that flour may be easily procured. Not having this facility, M. Saint Etienne conceived the idea of steeping the grain whole in water for two or three days, and then crushing it between rollers, and thus forming the paste. But this method was attended with a serious evil, viz. that the starch was not deposited, especially in summer. M. Saint Etienne attributed this to the quality of the water, but I convinced him that it was owing to the fermentation and partial germination of the corn, which being so long in contact with the water formed successively diastase and dextrine, and thus rendered the water which was used for washing the starch viscous. At my suggestion, he constructed an apparatus of wood, lined with lead, and having filled it three parts full of corn, he

then added water sufficient to cover it. This apparatus was submitted to a constant heat of 50° C. as the maximum, with a pressure of from 15 to 20 atmospheres, and in four or five hours the grain swelled so as to completely fill the apparatus. A great quantity of water being thus absorbed, a paste could easily be formed by passing it between wooden rollers. Paste thus obtained may be used for making starch, care being taken to leave it to settle for two hours longer than the paste made with flour before softening it; there is then less fear of fermentation, and about 10 per cent. more available paste will be obtained than by grinding.—*Newton's London Journal*, from *Bul. Soc. Enc.*

ART. LXXVI.—ON SOME SPURIOUS SORTS OF OPIUM.

By M. Batka.

The high price of this drug, caused by its scarcity, is a great inducement to adulterate it, or for making substitutes for it; and offers a large field for discoveries in pharmacognosy.

The opium, which I have now before me, consists of pieces like that from Smyrna, strewed over, as is usually the case, with the flowers of Rumex, but not wrapt in leaves. It is moreover as shiny as the Egyptian, only of a darker colour. Having been exposed for some time to the air, it is now almost without smell, very hard without being stony, does not become soft in the hand like genuine opium, feels like sand between the teeth, has a bitterish, but not bitter taste, glistens when broken, but is mixed with many light spots like *Resina garannæ*. When tested for resin by friction it shows no electricity; it carbonizes in the flame

without melting, and the smell which it then emits has a remote resemblance to that of frankincense, as it also does when triturated or dissolved.

It is easily triturated, whilst the genuine opium becomes more or less viscid; the powder is brownish and dry; the cold watery solution froths strongly as if from gum—the warm solution does the same, is brown, reddish if held against the light, but becomes cloudy on cooling. Litmus is without reaction on the watery solution; by alcohol an abundant precipitate is thrown down from the filtered solution, in which litmus becomes red after some time standing. The filtered watery solution by evaporation yields gum which burns to ashes. On burning the resinous residue it burns with a sooty flame and a resinous odour, leaving behind a coal which glowed and incinerated, evolving a disagreeable smell like that of animal glue. I thought it worth while to make a qualitative analysis of this opium, the result of which was:—

25 per cent. of matters insoluble in water and alcohol, consisting of:
7 per cent. of combustible matters, containing carbon and nitrogen.
18 per cent. of incombustible substances, viz. sand, traces of iron, lime, and lead.
64 per cent. of substances soluble in water=*Gum*.
9 per cent. of substances soluble in alcohol=*Resin*.
2 per cent. loss.

100 without any trace of morphia or meconic acid.

This so-called opium is, according to this analysis, decidedly an artificial composition, or rather a daring imposition, for there is not a trace of opium in it.* It was offered

* By treating the watery solution with dilute acetic acid, saturating with excess of carbonate of potash, filtering, then testing the sediment with nitric acid, no trace of morphia was obtained; the absence of meconic acid was proved by precipitating by sugar of lead, and testing with chloride of iron. By caustic potash and ether no trace of Merk's porphyroxin was discovered.

to me under the title of a "secondary sort (*beisorte*)" which immediately roused my suspicions. It had very likely been kept with opium, for it had at first the smell of this substance, which it had afterwards lost.

Another adulteration, under the name of "*Egyptian opium*," I saw in London, where I examined, under the denomination of "unrated goods," a box with cakes of catechu, which was there imported and consumed as Egyptian opium.

The Egyptian opium has, as is well known, a brown, bright, glistening colour, and by fracture presents here and there lighter, orange-coloured, clouded spots. The opium which I saw, and which I immediately recognised as a product, quite similar to Bengal catechu, by the bitterish and afterwards sweetish taste, resembled this opium perfectly both externally and internally.*

I must also mention another opium-like artificial product which I received in London through the kindness of Dr. Babington, from Calcutta, under the name of "*Dikki Malei from the Malabar Coast of India.*" Martius mentions something similar to this, when speaking of the Smyrna opium, but quite different from what I have received: this consists, namely, of rather equally formed opium-like cakes of two inches square, 3′ to 4′ thick, hard and dark, with spots on the surface, shining like gum; when rubbed they develope distinctly a smell of sealing-wax (perhaps arising from the mentioned *tichi* oil?) the fracture was like that of guaiacum, greenish yellow, and resinous, with brownish catechu-like spots (from the betel nut?). It is of a very peculiar astringent taste, sticking to the teeth, and leaving behind, when chewed, an orange-yellow powder, which

* An experiment with the mixed sulphates of iron produced the well-known greenish discolourization, and when treated with an excess of sulphuric acid, gelatine, and emetic tartar, which cause no perceptible reaction, the *tannin* was discovered.

contains, however, no rice flour, but only gum resin.* Merk observes in his chemical diagnosis of opium, that the opium obtained under the name of *Constantinople opium* contains the greatest proportion of sulphate of morphia. I have, therefore, always used acetate of baryta as a reagent in the examination of opium, in order qualitatively to determine the best sort; and, in fact, only the best Smyrna opium reacts upon it, and the Patna, Benares, English, Grecian, and Egyptian opium are at the utmost only clouded by it, but throw down no precipitate.—*Pharm. Jour. from Buch. Reper.*

ART. LXXVII.—ON POISONING BY VEGETABLES, OR THEIR PROXIMATE PRINCIPLES IN GENERAL, AND BY OPIUM OR MORPHINE IN PARTICULAR.

By M. Ch. Flandin.

This memoir is divided into two parts. In the first, the author proposes two new analytical processes, both based upon the two following experimental facts,—1st, that the proximate principles of poisonous vegetables, such as morphine, narcotine, brucine, strychnine, &c., are not decomposed

* According to a superficial examination the *Dikki Malei* cakes consist of :

95 per cent. substances insoluble in water, viz. :
60 resin.
35 other organic substances and sand.
5 per cent. *tannin* and gum, soluble in water.

100

when in contact with animal matters at a temperature of 211° F., or a few degrees above it; 2d, that ammonia precipitates the vegetable alkalies from their acid solutions when present, to the extent of a thousandth part and less.

The two processes have this in common, that at first whatever the matters for analysis may be, they must be dried in a sand-bath at a temperature not exceeding 239° F. They are then broken up, and afterwards powdered in a machine described in the first volume of the author's "Traité des Poisons," p. 414.

The matter thus prepared is treated, according to the more or less dry or coagulable state of the products, either with water acidified with 0.025—0.05 acetic acid, or with absolute alcohol, to which, according to the nature of the proximate principle to be sought for, a small quantity of powdered oxalic or tartaric acid is added. This addition of acid, which can, or rather ought to be made either before or after the treatment with alcohol, serves to transform the vegetable alkaline base into an extremely soluble salt or supersalt; because this salt has to be subsequently taken up by cold water, so that the base may be precipitated by ammonia.

In the analysis of the urine, the treatment must be special; but it is easily described. The liquid should be evaporated to the consistence of an extract, this completely dried by adding powdered alumina, and the solid, when perfectly pulverized, treated with cold water acidified with 0.02–0.05 acetic acid. The solution is precipitated by ammonia, the precipitate washed and collected.

In using these processes, it is no longer the extracts of animal matters which are subjected to the chemical reactions adopted for detecting the vegetable bases sought for; these bases are obtained in a pure state, or in the form of crystals. The author uses a small peculiar filter, described by M. Danger, by which the smallest quantity of any pre-

cipitate may be collected without loss, which is of great importance in delicate researches like the present.*

In the second part of the memoir, the author has applied the preceding researches to the study of opium, or rather one of its immediate principles, morphine. He has given various compounds of this base to several species of animals, cats, dogs, rabbits, birds, and a monkey.

An important fact resulting from these experiments is, that morphine is tolerated in enormous doses by the above animals. Is not this poisonous base decomposed, neutralized by the gastric fluids, under the influence of the vital force? It is known, on the one hand, that morphine is decomposed by certain powerful acids, e. g. nitric acid; the author has shown, on the other hand, that the same decomposition is produced by the action of a chloride or alkaline hypochlorite and a weak acid; the chloride of lime and the hypochlorite of soda produce this effect when acetic, oxalic and tartaric acids, &c., are present or act as immediate agents. The result of the latter decomposition furnishes a new reaction, which must be added to the most characteristic chemimal reactions of the alkaline vegetable bases. Thus morphine, under these circumstances, yields a fine yellow colour; narcotine, a red colour; brucine, a rose-red colour; whilst strychnine undergoes no change. There is nothing, therefore, which should occasion surprise in the fact, which the author thinks he has established by direct experiments, viz. that morphine may be decomposed or burnt during the process of digestion or the act of respiration.

But, admitting this to be the case, it is not less true, that, according to the doses taken, the whole of the morphine is not suddenly transformed or destroyed, either in the digestive canal or in the torrent of the circulation. The author has found this poisonous substance in the fæces of the animals; also in their urine, and even in their internal viscera.

* See Traité des Poisons, &c., p. 397.

Thus, in the case of a monkey, which for thirty days underwent a course of this substance, and during this interval took 30 grms., or an oz. of morphine, a decigramme was obtained in crystals from the urine. The author sums up in the following proposition: The vegetable poisons, especially morphine, are capable of being partly neutralized when mixed with the vital fluids or exposed to the influence of the vital forces; but the portion which produces the morbid effects, the portion which kills, remains undecomposed in the organs, and chemistry is capable of detecting it.

This proposition appears to involve an extremely interesting consequence. Infanticides produced by substances called *abortive* are real cases of poisoning, which may be confined to the product of conception, just as they may sometimes extend to the mother. Strictly speaking, all poisons, according to this view, are abortive substances. The poisonous substance is, as it were, directly transported to the organs of conception by absorption, the uterus, during pregnancy, by means of its peculiar function, exerting a kind of eliminating power. A small dose, incapable of killing the mother, suffices to destroy the fœtus; and when this is dead, abortion is the consequence.

In making experiments upon the mineral poisons, and especially arsenic, the author has seen rabbits abort, and found the poison in the young ones. These experiments have been renewed in studying the effects of morphine. Two rabbits which had taken the poison with their food aborted, as did also a bitch poisoned by subcutaneous absorption. Unfortunately, these experiments could not be made complete or conclusive; for the rabbits devoured almost all their little ones, and the bitch ate the placentæ in her case. The author thinks it highly probable that, as in the case of arsenic, the poisons reach the products of conception, and that chemistry may discover them when used as instruments of crime in cases of abortion; moreover, that poisoning is a phenomenon of absorption, and that the

agent of crime remains in those parts where it has produced its pathologic or mortal effects.

The author also proposes the use of weak acids, mixed with chlorides or alkaline hypochlorites, as antidotes to morphine, narcotine and brucine. The vegetable acids have been considered as counter-poisons to opium and the vegetable alkalies in general. Chemically speaking, the dilute vegetable acids are very powerful solvents of the proximate principles, as morphine, narcotine and brucine. Are they not counter-poisons merely because they meet with alkaline chlorides in the economy? As necessary adjuvants to these acids, it would then be very useful to conjoin the special chlorinated compounds which have been mentioned. These theoretical inductions must however be confirmed by experience.—*Chem. Gaz., from Comptes Rendus.*

ART. LXXVIII.—ON THE PREPARATION OF THE IODIDE OF LEAD.

By M. Boudet.

When iodide of lead is prepared by precipitating acetate of lead by iodide of potassium, a certain quantity of iodide of lead always remains dissolved in the liquid. Lepaire, who long since drew attention to the fact, states that this remainder of iodide of lead may be precipitated by the addition of a few drops of nitric acid, while basic acetate of lead sends down tribasic iodide of lead, and sulphuric and muriatic acids liberate iodine. On evaporating the liquid, it leaves, according to Lepaire, a white residue, which on treatment with water again deposits protiodide of lead.

The experiments made by the author on this subject confirm the previous statements. In order to discover whether the acetate of potash, which is formed by the double decomposition, is the cause of the increased solubility of the iodide of lead, the author triturated iodide of lead together with some acetate of potash. The mixture, after having deliquesced to a syrup from the absorption of moisture, soon became perfectly white, and had no reaction upon blue litmus-paper. After some length of time, silky needles of the protiodide of lead and potassium separated; on adding water to the mixture, the yellow iodide of lead was precipitated, and the liquid became acid. This liquid subsequently afforded with basic acetate of lead a yellow precipitate, and nitric acid and very dilute sulphuric acid likewise threw down some yellow iodide of lead. When the white syrupy mixture of acetate of potash and iodide of lead was previously extracted with alcohol, the white residue deposited, on the addition of a weak acid, a yellow protiodide of lead, and the filtered liquid gave, on the addition of nitric acid, a precipitate of the same compound. When, on the other hand, iodide of lead was boiled with an aqueous solution of acetate of potash, the author obtained a colourless acid liquid, which deposited white silky crystals of the protiodide of lead and potassium, while an insoluble yellowish-white residue of the oxyiodide of lead was left. Hence it appears that wherever acetate of potash and iodide of lead come in contact with each other, the precipitate never contains the whole of the iodide of lead formed; but, on the contrary, there is always a loss due to the protiodide of lead and potassium remaining in solution. No such loss occurs on precipitating iodide of potassium with nitrate of lead.—*Chem. Gaz. from Journ. de Pharm. et de Chim.*

ART. LXXIX.—ON THE REMOVAL OF THE BITTER TASTE OF SULPHATE OF MAGNESIA.

By M. Combes.

It has long been a desideratum to remove the bitter taste of that valuable purgative salt, the sulphate of magnesia. After a number of trials, I have at last suceeded in effecting this by the simultaneous administration of tannin or coffee; the former however is an active agent. 1½ gr. of tannin, when boiled for three minutes with an ounce of the sulphate and about 1½ pint of water, entirely conceals the taste of the salt. The peculiar astringent taste of the tannin may be removed by an agreeable aroma. In roasted coffee we have both the advantages combined. The following are the best proportions:—

Take of Sulphate of magnesia, 1 oz.
Powder of roasted coffee, 2½ drms.
Water, about 16 oz.

Boil well for two minutes (not in a tinned vessel), remove from the fire, and let the mixture infuse for some minutes, so as to allow time for the development of the aroma; then filter, or merely strain off. It must be sweetened to the taste. This fluid does not impart the slightest taste of the bitterness of the sulphate. The salt does not undergo any decomposition by this process.

It should be observed that the infusion is not capable of removing the bitterness, nor will the addition of the salt to the filtered decoction answer the purpose.

Should it be required to increase the amount of the sulphate without augmenting the proportion of coffee, 2 or 3 grs. of tannin should be added to the boiling decoction. The aroma of the coffee masks the disagreeable taste of the tannin. Orange-flower water is also useful in concealing the flavour of tannin.—*Ibid from Ibid.*

ART. LXXX.—ON THE MOST ADVANTAGEOUS METHOD OF EXTRACTING IODINE FROM DILUTE SOLUTIONS.

By J. Persoz.

Now that iodine is so extensively used in medicine, and that its price is constantly on the increase, the want is felt more than ever of extracting it with the greatest economy both from the waters which contain it naturally, as from those of baths into the composition of which it enters, and even from the urine of the patients submitted to a course of iodine. Soubeiran, finding the process previously followed for the extraction of the iodine from the mother-waters of the Varech sodas too tedious and expensive, proposed to precipitate this body by sulphate of copper, to which a certain quantity of iron filings was added, with a view to reduce the periodide of copper to the state of protiodide. Subsequently the protosulphate of iron was substituted for the iron filings.

The irregularity of the results obtained by both these processes must have struck every one who has tried them; it is therefore not surprising that a more certain method has been proposed as a substitute. MM. Labiche and Chantrel have described one which is based upon the insolubility of the iodide of starch, but which in practice presents a difficulty which these gentlemen seem to have overlooked. In fact, iodine combines with starch only when it is in a free state; it is consequently requisite to liberate it from its combinations by means of chlorine, and this presents an insurmountable difficulty.

Having been called upon to examine this question, I found, in the first place, that the protacetate of iron, substituted for the protosulphate, produces a more rapid reduction; but as it is impossible to reckon upon a regular precipitation of

the protiodide of copper, owing to the influence which the respective proportions of the solutions employed exert, I had recourse to sulphurous acid, a powerful reducing agent, and whose action upon the peroxide of copper, which it reduces partially to the state of protoxide, was pointed out by M. Chevreul. A few words will suffice to render this kind of reaction intelligible. If 1 grm. of persulphate of copper be dissolved in 150 centigrms. of water, and to this solution 1 grm. of sulphate of soda be added, the liquid acquires a green colour, and becomes turbid. As the formation of a precipitate should be avoided, and at the same time the liquid decolorized, the requisite quantity of sulphurous acid to obtain this double result is added; on letting fall a drop of a solution of iodide of potassium into it, it immediately becomes opalescent, the turbidness goes on increasing, and in the course of an hour a white, slightly-pinkish precipitate of the protiodide of copper is formed, which is readily collected by boiling the liquid for a few minutes, and then decanting.

Accordingly, in treating iodurettted waters, sulphurous gas should be passed into them until they exhale a faint odour, in order to convert all the iodine which may exist in the state of iodate into iodurettted hydrogen; then to prevent the formation of the precipitate from the mutual action of the sulphite of soda and the persulphate of copper; and lastly, to cause the reduction of the peroxide of copper. For this purpose, therefore, there is successively dissolved in the liquid under treatment 1 part of persulphate of copper and 1 part of bisulphite of soda, calculating approximatively the amount of the first for the quantity of iodine supposed in solution, upon the fact that about 3 parts of the persulphate of copper are required for 1 part of the iodide of potassium or sodium. The liquid is then left to itself or boiled, according to whether the precipitate is desired immediately or after a few hours. On letting the precipitate form in conical vessels, it is easy to collect it into a small volume; in

every case it is brought upon a filter, washed, dried, and the iodine extracted by one of the known processes. Calcining the protiodide of copper, previously mixed with 2 equivs. of peroxide of manganese, may be successfully employed. The reaction above described is so readily produced, that we have no doubt that in future all ioduretted waters, even the weakest, will be treated by this process; and that it will likewise be successfully employed for the analysis of mineral waters containing bromine and iodine.

Chem. Gaz. from Jour. de Pharm.

ART. LXXXI.—ON THE ACTION OF VOLATILE OILS ON THE SULPHATES IN AN AQUEOUS MENSTRUUM.

By Mr. William Bastick.

In making some experiments in reference to the best method of preserving the aromatic distilled waters of the Pharmacopœia, I was induced to try the results arising from a mixture of volatile oils with water, obtained from a spring, containing a considerable quantity of sulphate of lime, and other salts in solution, but no organic matter, and having neither acid nor alkaline reaction.

The various oils were mixed with different portions of water, and kept in bottles in a moderately warm place for about two months. At the end of that time the waters were examined, and found to be saturated with sulphuretted hydrogen, the presence of which was readily ascertained by the smell, and by precipitation of the metallic bases usually adopted for that purpose.

On removing the sulphuretted hydrogen by precipitation with a metallic salt, the whole of the volatile oils were found to have disappeared; no trace of them could be discovered by the taste or smell; and on examining the waters

for sulphuric acid, by means of muriate of barytes, no precipitate could be obtained but what was soluble in nitric acid, clearly showing the entire decomposition of the sulphates in the original water. After boiling the waters to free them from sulphuretted hydrogen, they were found to possess an alkaline reaction, and to evolve carbonic acid on the addition of an acid.

The waters had not become mucilaginous, as is usually the case when decomposed, but to the eye preserved the same appearance as when first prepared.

In fact, the metamorphoses appear to have been brought about by the mutual reaction of the elements of the sulphuric acid, of the salts, and the volatile oils. The sulphur of the sulphates, forming with the hydrogen of the oils, sulphuretted hydrogen, and the carbon of the volatile oil combining with the oxygen of the sulphuric acid, producing partially, if not wholly, carbonates of the bases with which that acid was previously combined.

It is quite evident that the only source of sulphur must have been the sulphates, as the water originally contained no trace of sulphuretted hydrogen, and the volatile oils used were such as peppermint, dillseed, &c., and are composed only of carbon, hydrogen, and oxygen.

I will take this opportunity to observe that the remarks of Mr. Warington upon distilled aromatic water, published in this Journal, are fully borne out by my own experience, as to the inutility of the spirit directed to be used by the Pharmacopœia in their preparation, and to the still worse method of preparing them extemporaneously by means of carbonate of magnesia. The simplest and best plan of obtaining quickly the distilled waters used in Pharmacy, is by merely agitating the volatile oils with distilled water in such proportions only as the water will take up. The quantities of volatile oils ordered by the Pharmacopœia are in excess, but by the methods there prescribed the excess is removed in the processes of filtration or distillation.

Pharm. Journ.

ART. LXXXII.—CIRCULAR OF THE NEW YORK COLLEGE OF PHARMACY RELATIVE TO THE ADULTERATION OF DRUGS.

THE undersigned, a Committee of the Trustees of the College of Pharmacy, of the city of New York, respectfully solicit your attention to the proceedings of the Board, on the 9th inst., viz.:

"At a special meeting of the Board of Trustees of the College of Pharmacy, of the city of New York, held August 9th, 1847, convened for the express purpose of taking into consideration the best measures to prevent the introduction, throughout the United States, of sophisticated and misnamed Chemical and Pharmaceutical preparations—it was unanimously

"Resolved, That the officers of this Institution be requested forthwith to call the attention of the Secretary of the Treasury of the United States to the fact that large quantities of spurious medicinal preparations are being introduced daily into this country, not only to the prejudice of the custom house revenue and the honest importer, but in the sequel jeoparding the health and lives of all those who require medical aid throughout the land. That the Secretary of the Treasury be respectfully requested to apply the most stringent regulations within his power, to check this alarmingly growing evil.

"It was further Resolved, That the Philadelphia College of Pharmacy, and other colleges of Pharmacy and of Medicine, be officially requested to unite with us, in presenting memorials to Congress, to devise means to suppress this most dangerous fraud, by making all such sophisticated articles liable to forfeiture."

In accordance with our instructions, we respectfully ask your co-operation in a general call upon Congress, at its

approaching session, for the passage of such a law as may effectually resist the villainy of manufacturers and importers of base compounds, counterfeit and misnamed articles, intended for medicine, so far at least as it can be done, in their passage through the Custom House, by competent inspection, forfeiture, and exposure of the shame now borne in secret by the participators in this traffic.

A few of many facts may be stated in illustration of the urgent necessity for such a law.

Bromide is imported and sold for iodide of potassium, some parcels being mixtures and others entirely bromide. The iodide is also adulterated frequently in large proportion with other salts of an entirely different character.

Blue pill is imported containing a per centage of mercury from 10 down to 7½, mixed with blue clay and Prussian blue, to give the proper density and colour. Two importations of this kind from the manufactory of William Bailey, of Wolverhampton, have been publicly exposed by this College in the newspapers, the first in the year 1845, and the second and worse lot during the present month. Its composition, according to the analysis of our Prof. Reid, is:

Mercury,	7. 5
Earthy clay,	27. 0
Prussian blue used in colouring,	1. 5
Sand in combination with the clay,	2. 0
Soluble saccharine matters,	34. 0
Insoluble organic matters,	12. 0
Water,	16. 0
	100. 0

An account of the former, with the correspondence between our late President Adamson and Mr. Bailey, was also published in the American Journal of Pharmacy, vol. 11, (new series) p. 148. The latter appears in the New York Journal of Medicine for September.

Very large quantities of rhubarb, much decayed, the better parts of which are dark coloured, with scarcely any taste or smell, having probably been exhausted to make

extract, come from England, invoiced there from 1¼ to 3 pence sterling per pound. It is intended and used for powdering, colour being given to it by turmeric, &c.

The article called oxyd of zinc on the English labels, is generally carbonate of zinc, being imported at a price which precludes the possibility of honest preparation.

All that is received under the name of precipitated sulphur (or "lac sulphur," as the merchants commonly term it,) except when it is expressly ordered from an honorable manufacturer, contains from 80 to 95 per cent. of sulphate of lime.

Opium is often invoiced at one-third the value of good quality, and is found upon examination not to be worth even that. The same may be said of scammony.

Most of the foreign extracts are not what they profess to be, and cannot be relied upon in the treatment of disease.

The salts of quinine, morphine, and all the more costly chemicals, are greatly adulterated.

We are informed by the agent of an English manufacturer of chemicals, extracts, and many other preparations used in medicine, that it is a regular and systematic business, carried on by his principal and others in his line, to make articles for the American market of different qualities, one for the Atlantic cities, and another, very much inferior, "for the west," meaning thereby our western states. He gives us, for instance, the following quotations: "Compound extracts of colocynth 9*s.* 6*d.*; do. for the west 5*s.*"—the latter, as we are allowed to infer, containing no scammony at all, only the poorest sort of aloes, and but little, if any, colocynth, or extract from it. "Blue pill 3*s.* 9*d.*; for the west 1*s.* 8*d.*"

Is it wonderful that such enormous doses as we hear of, are taken, and indeed required at the west, and that disappointment everywhere is experienced by physicians in the action of medicines? And these examples are but few out of many that might be given. Our country is held an easy prey to the rascality of foreign counterfeiters, aided and

abetted by domestic traitors, who trample down all considerations of the evils they inflict, or help to fasten upon their suffering fellow men, in this unrighteous pursuit of gain. We who have more of the prominent facts before our eyes, in this greatest drug mart of the Union, than come under the notice of others, and seeing the audacity with which this base trade advances, feel ourselves especially called upon to oppose it. We believe that stringent measures should be adopted by government to suppress it altogether, and to obtain the proper action on the part of Congress, it is but necessary to present the facts in connexion with the general corroborating testimony of Medical institutions and practitioners of medicine and pharmacy throughout the country, which we doubt not will be cordially tendered in support of our application.

We subjoin a copy of our proposed memorial, which, if it be agreeable to you to second our efforts, you will adopt if you think proper, or—as we should prefer—set forth your convictions in your own form. We would respectfully suggest early action, as more likely to prove successful; and also the advantage of adding the signatures of physicians and apothecaries in your neighborhood, as far as may be conveniently practicable. Any communications on the subject (which may be addressed to our President) will be fully acknowledged, and all information that we have, freely given.

We are yours very respectfully,

JOHN MILHAU, President.

OLIVER HULL,
GEO. D. COGGESHALL,
W. L. RUSHTON,
} Vice Presidents.

JAS. S. ASPINWALL, Treasurer.*

JOHN SNOWDEN, Secretary.*

New York, August, 1847.

* Names entered by G. D. Coggeshall, Mr. A. being absent from the city. Dr. Snowden's authorised.

Attached to the above circular is a memorial to Congress embracing the views set forth in that document, which concludes with the following paragraph: "Your memorialists therefore pray your honorable bodies that a law be enacted declaring that all imported articles intended for medical use, which may appear to the proper Custom House Officer to be spurious, counterfeit, or adulterated, shall be subject to competent inspection, and if found to be of base character, confiscated and destroyed."

MINUTES OF THE PHILADELPHIA COLLEGE OF PHARMACY.

A Stated Meeting of the Philadelphia College of Pharmacy was held at their Hall, Ninth month 27, 1847. Present 22 members.

President, DANIEL B. SMITH, in the Chair.

The minutes of the Board of Trustees were read, by which we are informed that Jacob L. Baker, Alfred K. Scholl, and James H. Crew, all graduates of the College, have been elected Resident Members. The Board have also elected Edward McInall, of Wilmington, Delaware, and Edward S. Wayne, of Cincinnati, Ohio, Associate Members.

The Committee on Latin Labels report, that they have completed the printing of the edition authorized by the College at a former meeting; and they are continued to superintend the distribution, and report when prepared.

The following communication was accepted and the Committee discharged. The copies of the Constitution and

By-Laws which have not been appropriated, are directed to the care of the Librarian.

The Committee appointed to assist the Secretary in preparing for publication the Constitution of the College and a revised list of members, Report, That they have prepared from the minutes the amended Constitution, and a revised list of members, 750 copies of which have been published at a cost of twenty-two dollars, an order for which has been drawn upon our Treasurer.

According to the direction of last meeting, a copy has been furnished to each member, and the balance is now at the disposal of the College. The Committee ask to be discharged.

All which is respectfully submitted.

SAMUEL F. TROTH,
WILLIAM PROCTER, Jr., } Committee.

Philada., Ninth month 27, 1847.

By the minutes of the Board of Trustees, a Circular and Memorial to Congress, prepared by the New York College of Pharmacy, has been forwarded to this College for its action. The circular detailing some of the impositions which are practised upon the public, by the importation and sale of adulterated drugs, and proposing that Congress should be memorialized upon the subject, was read, and elicited an animated discussion, in which some of the evils resulting from this wicked traffic were exposed.

On motion, the Corresponding Secretary was directed to acknowledge the receipt of the document, and to state that the subject will claim the serious attention of this College.

On motion of Professor Carson, it was Resolved, That a Committee be appointed to take into consideration the subject of the adulteration of drugs,—to enter into the whole subject, and report to an Adjourned Meeting of the College all the information that can be obtained, and the best means of checking or preventing this evil.

The College appointed on the Committee Daniel B. Smith, Charles Ellis, Ambrose Smith, Thomas P. James, Edward Parrish, and Professors Bridges, Carson, and Procter.

The edition of Patent Medicine Directions being nearly exhausted, it was, on motion of Charles Ellis, Resolved, That a new edition be printed, and that a Committee of three be appointed for that purpose, with authority to use any funds on hand which have arisen from the sale of directions and Latin labels, or which may be at the disposal of the Committee on the Sinking Fund.

On motion, the Committee on the Sinking Fund, consisting of Samuel F. Troth, Warder Morris and Joseph C. Turnpenny, were appointed.

The following communication was presented and read, and the members whose names are attached thereto were appointed to give attention to the subject embraced in the resolution.

To the Philadelphia College of Pharmacy.

We, the undersigned, members of the College, beg leave to call your attention to a subject of some importance to the interests of the Institution.

We allude to the Cabinet of the College, and think that an establishment with the reputation of the Philadelphia College of Pharmacy should have a collection of Materia Medica, Chemical and Pharmaceutical Specimens, commensurate with its magnitude—not only as affording an excellent basis for illustration in the School of Pharmacy, but as a means of comparison in cases of investigation.

When it is understood that the College possesses no Cabinet of Chemical and Pharmaceutical Specimens whatever—that its collection of the Materia Medica is extremely imperfect, (the illustration of the lectures depending almost entirely on the cabinets of the Lectures,) it cannot but excite surprise. A good collection is not the work of a year; and at

every change in the teacher a new cabinet has to be rebuilt. One of the first steps taken by the London Pharmaceutical Society, after its organization, was the founding of a Museum; and in six years that have elapsed since its commencement, it has increased to a very respectable size, chiefly through the contributions of members. We believe if the College would provide a suitable place of deposit, in the shape of cases and glass jars or bottles, that the collection may be made up in a great measure by voluntary contributions; and by publishing to the world through the Journal the endeavours that are making, the invitation would be extended to all who felt an interest in the institution. Such a course, steadily pursued, would in a few years render the College independent of its lecturers, greatly advantage its School of Pharmacy, and eventually produce a Museum of which we may well be proud.

We therefore ask that you pass the following resolution:

Resolved, That a committee of five members be appointed, to take into consideration the best means to be adopted to form a Museum of Chemical, Pharmaceutical, and Materia Medica Specimens, and report at the next meeting.

Signed DANIEL B. SMITH,
CHARLES ELLIS,
WILLIAM PROCTER, Jr.
JOSEPH CARSON,
ROBERT BRIDGES.

On motion, the College proceeded to the election of eight Trustees. The tellers reported that the following named gentlemen had received the requisite number of votes, and they were accordingly declared duly elected.

Thomas P. James, William J. Jenks,
Jacob L. Smith, Caleb H. Needles,
James L. Elliott, Benjamin R. Smith,
Robert Shoemaker, Ambrose Smith.

Then, on motion adjourned.

DILLWYN PARRISH, *Secretary.*

A Special Meeting of the Philadelphia College of Pharmacy was held Eleventh month 1st, 1847. Present 28 members.

Vice President, CHARLES ELLIS, in the Chair.

The meeting being called by the Committee appointed on the subject of the adulteration of drugs, &c., its object was introduced by reading the minute of the last Stated Meeting, and the resolution of Professor Carson appointing the Committee.

The Committee have given attention to the important subject entrusted to them, and are further continued.

They produced a memorial to Congress, which, after discussion and some amendments, was adopted, directed to be signed by the officers of the College, and at a suitable time forwarded to both Houses of the National Legislature.

The Memorial is as follows:

To the Honourable Senate and House of Representatives.

The memorial of the Philadelphia College of Pharmacy, respectfully represents:

That one of the chief objects of the establishment of their institution, was "to direct attention to the quality of drugs brought into the market," with a view to correct the evils arising from the introduction and sale of spurious and sophisticated articles.

That they have, from time to time, by the proper education of young men in their school of Pharmacy, by exposing frauds of various kinds when discovered, and by the publication of a *Journal*, which assumes a high tone in it exposition of these abuses, done much to correct the evils spoken of.

That it has now become notorious amongst druggists, that of late, important drugs and medicines are specially adulterated in foreign countries, for sale in this country, and pass daily through the Custom house, to be disseminated by ignorant or unprincipled dealers, to the great detriment of our citizens.

That whilst we are aware there are domestic abuses of grave character to correct, and which it is the ceaseless exercise of this and similar institutions to do away with, by elevating the character of the practitioners of Pharmacy, and disseminating a knowledge of these abuses, and the means of detecting them—a work which has more especially engaged us at this time,—we believe that Congress possesses the power in the enactment of a suitable law, to exert a highly beneficial influence on the character of imported drugs, by rendering it impossible to introduce them without undergoing inspection by a proper and qualified inspector, whose duty it should be to ascertain the real character of the drugs and chemicals destined for medical use, and keep such records, that honest dealers may ascertain at any time the character of the importations and take means of protection against imposition. We believe that such a law would within a moderate period, exhibit a very evident influence on the quality of importations; as it is generally only necessary that such sophistications be known, to be condemned by the majority of dealers.

Your memoralists therefore ask of your honourable bodies, that a law be enacted embracing the appointment of a proper inspector at each chief port of entry, whose duty it shall be to examine all the importations of drugs, medicines, and chemicals used as medicines, and, if necessary, have them properly tested; keep a full record of such inspections, including the names of the parties, which shall be open for consultation to the druggists, apothecaries, physicians, and others, concerned, or adopt such other measures as in your wisdom may seem best adapted to prevent the evil complained of.

On motion of Professor Bridges, it was Resolved, That copies of the Memorial passed this evening be transmitted by the Committee to the various Colleges of Medicine and Pharmacy of this country, with an urgent request that they will co-operate in obtaining the proposed results.

Then on motion adjourned,

DILLWYN PARRISH, *Secretary*.

MISCELLANY.

On the Essential Oil of Bitter Almonds.—By Mr. R. D. Grindley.—There is a great discrepancy in the opinions that have been expressed by Chemists and Toxicologists, as to whether the pure oil of bitter almonds, or hydruret of benzoyle, be poisonous or not. By some the known poisonous properties of the crude oil of bitter almonds of commerce is ascribed entirely to the hydrocyanic acid which it contains, while others assert that the oil freed from prussic acid is still a violent poison. The experiments which are mentioned by Dr. Christison and Dr. Pereira would appear to have settled the question, and to have left no further doubt, that pure oil of bitter almonds possesses no poisonous properties; but the assertion of the opposite opinion in the *Outlines of Chemistry*, more recently published, by Dr. Gregory, has again created doubts on the subject.

As public attention has of late been so much directed to this substance, I felt desirous of making some experiments on it, and my results are as follows:—

At first I adopted the usual plan for removing the hydrocyanic acid, by distilling the commercial oil with a mixture of protochloride of iron and lime; the product was still contaminated with the acid, and several repetitions, conducted with every precaution, were attended with no better success; I then adopted, by the suggestion of Mr. Redwood, the following method which proved most satisfactory. The oil was mixed with an equal quantity of water, and digested in a water-bath with binoxide of mercury, and small quantities of lime and protochloride of iron; time having been alowed for the decomposition of the acid, the whole was introduced into a copper retort, and subjected to distillation; the product consisted of pure hydruret of benzoyle, while bicyanide of mercury, benzoate of lime, chloride of calcium, and oxide of iron, remained in the retort, with benzoine and any excess of the ingredients employed.

The process is founded upon the strong affinity which exists between mercury and cyanogen, so that when binoxide of mercury and hydrocyanic acid are digested together, they are both decomposed, bycanide of mercury and water being formed. The protochloride of iron, which with the lime yields protoxide, is introduced to prevent the formation of benzoic acid, from the oxidation of the oil; for the same reason, care should be taken to conduct the process with as little access of air as

possible. The oil thus procured was pure and colourless. No trace of nitrogen could be detected by Lassaigne's test, which I found to be exceedingly delicate, affording indications of the presence of that body in extremely minute quantities of morphia, narcotine, &c.; it consists in adding to a very small quantity of the substance to be tested, in a small German glass tube, a fragment of potassium, about the size of a millet-seed, and heating the tube in the flame of a spirit-lamp, until the organic substance is completely carbonized, the carbonaceous residue is treated with cold water, and to the clear decanted liquor, a drop of a solution containing the mixed oxides of iron is added; a dirty green precipitate is immediately formed, which, if nitrogen be present, is changed into a bright blue, on the addition of a drop of hydrochloric acid.

Five drops of this pure oil were administered to a rabbit, and no effect being produced, ten more, dissolved in olive oil, were given to the same animal the following day, still without any injurious results, except slight irritation, attributable to the acridity of the oil; thus giving satisfactory evidence of the fact that essential oil of bitter almonds when *pure*, does not possess poisonous properties.

The extreme difficulty of freeing the oil from the hydrocyanic acid by the usual process, seems to account for the contradictory results of former experiments; and when we reflect on the numerous fatal consequences attending the use of this article for domestic purposes, and the simplicity and economy of the above process, it becomes important that manufacturers of this article should give their attention to the subject, and endeavour to supply the public with a preparation at once perfectly harmless, and still possessing the agreeable flavour for which it is so highly esteemed.

The following letter, relating to this subject, from the *Manchester Guardian* of June 19th, has been forwarded to us by a correspondent:—

Caution to Druggists and Housekeepers.

To the Editor of the Manchester Guardian.

Sir—I think it my duty to give publicity to the following case, not with a view to censure any one, but to caution druggists and housekeepers against the practice of vending and employing for culinary purposes, the essence of bitter almonds, without due *printed* instructions as to the quantity to be used, and the danger of deviating from the instructions given:

I was called professionally to a lady labouring under symptoms which induced me to inquire into the diet taken on the previous day, when a statement was given, proving that some custard of which she had partaken had acted poisonously (though, happily, not fatally,) her

symptoms having been such as are familiar to medical men as the effect of an over-dose of prussic acid. Bitter almonds in substance, and in the form of essence, likewise the kernels of stone fruit, contain this acid in different proportions, which fact should be known, as it is much to be feared that these articles are used ignorantly with respect to their dangerous properties. In mentioning the case of my patient to a medical man, he informed me that a friend of his had had placed before him some custards, which seemed to be superimpregnated with bitter almonds. On questioning the cook as to what she had used, she replied, "Nothing but almond water, which is a harmless thing; I'd drink a bottle full of it!" "Would you?" replied the gentleman, "then bring me the liquid and the cat; when on pouring a small quantity of the liquid into the animal's mouth, poor puss instantly expired. The object of this notice, then, is to caution druggists especially against selling bitter almonds, or the preparation entitled *essence* of the same, without explicit *printed* directions as to the quantity which may be safely used (if the pampered appetite require that they should be used at all) as adjuncts to custards, puddings, and such like articles of diet.

CHIRURGICUS.

Pharmaceutical Journal.

On Vanilla and its Culture. BY DESVAUX.—The cultivation of vanilla requires a damp but warm climate and a good soil. Hence a ground with low shrubs, which give little shade, is best adapted. It is not necessary to till the ground in any way, but the slips of vanilla are planted at the root of a tree or shrub on the approach of the rainy season when they creep up around the trunk. Once a year the plantation is cleared of the exuberant shrubs, and in the third year the plants bear fruit. The inhabitants of Misantla, twenty-four leagues north-west of Vera Cruz, are the only persons of the republic of Mexico, engaged in the cultivation of this plant. They distinguish five sorts:

1. *La Corriente*, of which there are two kinds: one with a delicate fine skin, rich in seeds and pulp, and the other of an inferior quality and with a thick skin; the *Lec*, *Ley*, or *Leg*, of some parts of South America, the genuine vanilla of commerce. Perhaps *Vanilla aromotica*, Sw.?

2. *La Sylvestre*, or *Cimarrona* [wild vanilla]; the fruit is smaller than the foregoing; it grows in the shade, or among the shrubs, its fruit therefore is less developed than that of the cultivated vanilla, with which it is identical. Some call it Simarona.

3. *Mestiza.* The unripe fruit is green, with brown spots; more cylindrical than the genuine, and easily dehiscing on becoming dry.

4. *La Puerca.* The fruit is much smaller than the first kind, and in the unripe state is dark green; when drying, it evolves an offensive smell, from which it is also called *hog vanilla* (*vanille de cochon.*)

5. *La Pompona* (*v. pompona*, Schiede.) The fruit is shorter and thicker than No. 1, and has a very delicate epidermis. The smell is pleasant and is particularly obvious when becoming dry, but is not so agreeable as that of the first sort; in time it loses its smell, and hence is but little valued. This probably is *Bova thick vanilla* (*v. bouffié*) of some authors, and is known in France under the name of *Vanillon.*

The harvest begins about the month of December, and the yellowish green colour of the fruit, which was formerly green, indicates its ripeness. Often, however, the fruits are gathered before they are ripe, partly by the proprietors, partly also by persons who like to reap what others have sown. The pedunculus is always left on the fruit. After the harvest the fruits are allowed to dry a little till the pedunculus loses its green colour, whereupon the dressing of the vanilla commences in the following manner:—Straw mats covered with woollen blankets are spread on the ground; when the latter are well warmed through by the sun, the fruits are spread on them, so that they are equally exposed to the sun. Then they are wrapped in the blankets, placed in boxes, covered with cloths, and still further exposed to the sun. Within twelve hours they should have assumed a coffee-brown colour; if this is not the case, the process is repeated on the following day. Should the weather be unfavourable, artificial heat is employed. In order to make the quality of the vanilla still more perfect, they are again daily exposed to the sun on mats for about two months. Practice soon teaches the cultivator to know when the fruits are sufficiently dry, to which point particular attention must be paid, as they otherwise lose in weight and quality. When the dressing is finished, the fruits are tied up in bundles of fifty and packed in tin boxes. It happens, however, not unfrequently, that inferior sorts, such as the *puerca* and *pompona*, are placed in the middle of the bundles, instead of the genuine sorts; of which five kinds are distinguished, viz., *primiera*, which must be twenty-four centim. long, and proportionately thick, and filled with pulp to the pedunculus; *chica fina*, which is shorter than the foregoing, so thattwo fruits are couuted for one; *sacate*, which is less thick than the first, and at the base not quite filled with pulp; *resacate*, which is small, dry, and four are reckoned for one; these are the fruits which have been gathered before they were ripe; and *basura*, the most inferior sort, the fruit of which is very small, spotted, and cut or broken.

For merly, and even at the time when the Spanish colonies were independent, the value of the crop amounted in the district of Misantla to no more than 50,000 st. yearly; in the year 1844, however, it yielded two millions; in 1845, three millions, and a further increase of a million may be expected in 1846. Impositions, robberies, &c., appear to be very common in the vanilla trade. Schiede, in his botanical reports from Mexico, (Linnæa, von Schlechtendahl, vol. iv., 1829) says, that besides Misantla, the cultivation of vanilla is carried on also in Papantla, Nautla, and Colipa.—*Pharm Jour., from the Ann. d. Sciences.*

Test for Anhydrous Alcohol. By CASORIA.—In order to determine whether alcohol contains water, let a sample of it stand for some time in a well-closed vessel, with anhydrous sulphate of copper. If water be present, the latter assumes a blue colour; but it remains white if the alcohol be free from water.—*Pharm. Journ.*

Production of Nobili's Coloured Rings, from Zinc, by Galvanism. By A. A. C. WALTER.—A cup having been filled with a concentrated solution of chloride of zinc, a platina wire from the zinc pole of a strong voltaic battery was dipped into it, and then a silver-plated copper disc, fastened to the platina wire of the copper pole, was introduced into it. Nobili's coloured rings appeared on the plated surface, which, however, soon became dim again. At the same time, foliaceous vegetations of glittering metallic zinc precipitated from the wire of the zinc pole, which soon extended to the copper plate. The latter having been removed, and the wire of the copper plate again introduced, the vegetative formation of zinc soon lost its metallic appearance, and changed into a granular mass of a gray colour, which entirely dissolved after a short time.—*Ibid, from Central Blatt.*

How to distinguish Stains of Blood from other Stains.—Peroz found that blood-stains are blackened by hypochlorous acid, while most colouring substances are bleached by it. Brame adds, that the hypochlorous acid should be free from the perchloride of mercury, as it is easily obtained by Williamson's method, or by agitating fresh chlorine-water with peroxide of mercury. The same author advises removing the stains with faintly-alkaline water, and then performing the experiment in a glass tube. The solution then appears, at a certain degree of concentration, red by reflected light and greenish by transmitted light. M. Buchner states, that the presence of mercury does not appear to interfere in the least with the reaction of the acid, and that the blood-stains instantly become brown, but not black. Chloride of lime or

chloride of soda and an addition of muriatic acid may also be employed.—*Chem. Gaz., from Liebig's Annalen.*

On the Use of Artificial Ultramarine for Colouring Sugar.—In France, artificial ultramarine is employed for giving to dragées, bonbons, &c., a pretty blue colour. But if the latter contain some acidulated juice, they assume a very disagreeable taste of sulphuretted hydrogen, although the colour remains equally brilliant. Chevallier succeeded in preventing this, without prejudice to the colour, by boiling the ultramarine before employing it, with water acidulated by acetic acid, and then washing it with hot water.—*Pharm. Journ. from Journ. de Chem. Med.*

Pharmacy in China.—The Chinese are in advance of the English in the regulations established for the practice of Pharmacy, as none but qualified men are allowed to engage in business as Pharmaceutists in China, which is not yet the case in England.

The Emperor of China has decreed, by a law passed in May, 1846,

1. That the proprietor of every Pharmaceutical establishment shall be required to have a diploma, signed by three members of the Academy of Medicine, who shall testify to his competency, after having satisfied themselves by an examination.

2. That every Pharmaceutist shall be required always to keep camphor, rhubarb, and liquorice, in his shop.

3. That purgative salts, calomel, laudanum, arsenic, and other similar substances, shall be only sold when ordered by the prescription of a medical man, or sanctioned by a magistrate.

The Pharmaceutist is also required to keep a sufficient supply of *Ginseng root*, and to superintend the growth of the plant furnishing this very costly, but favourite Chinese remedy.—*Pharm. Jour., from Repertoire de Pharmacie.*